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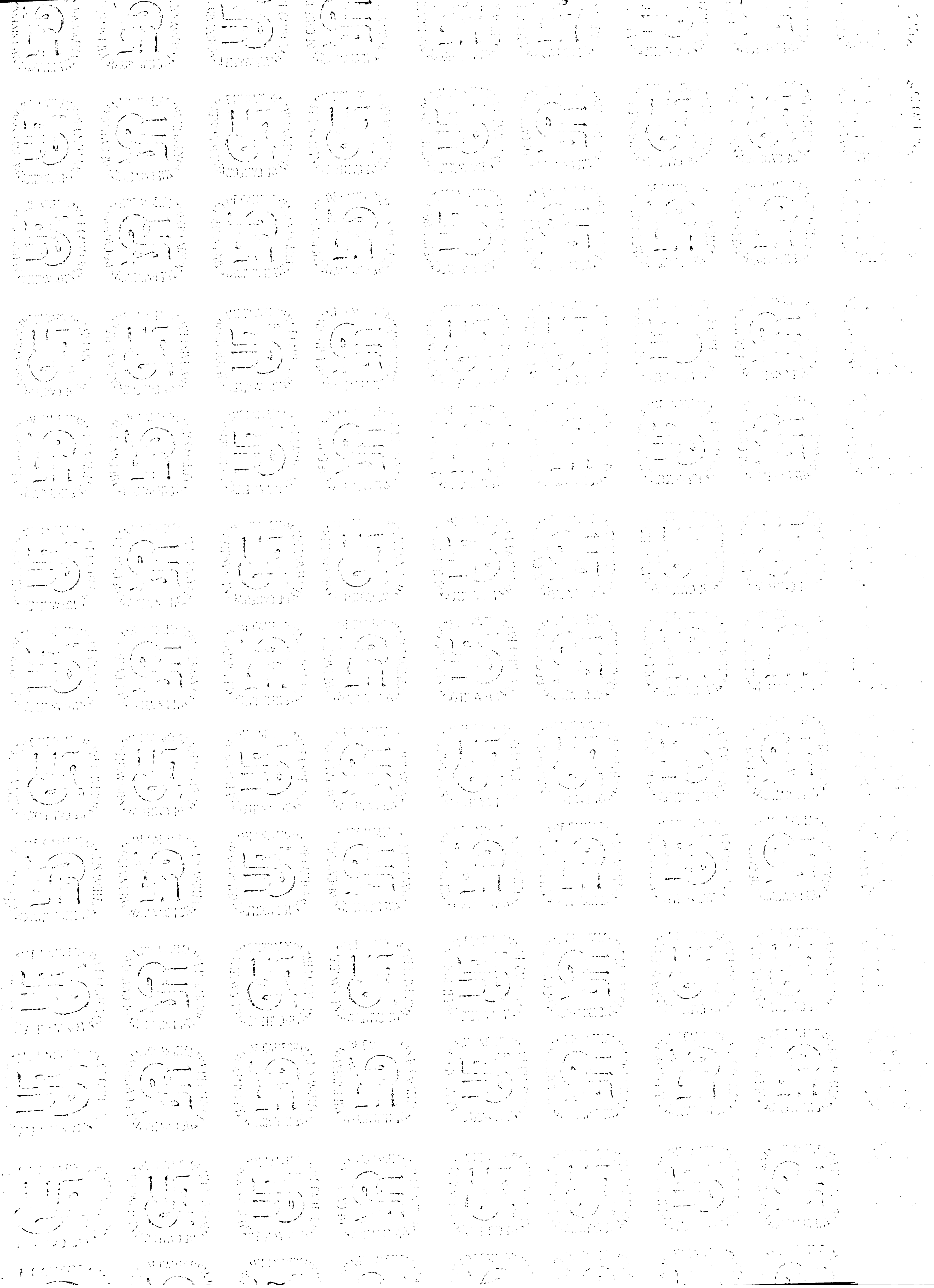


FAR EASTERN REVIEW

COMMERCE ⊛ ENGINEERING ⊛ FINANCE

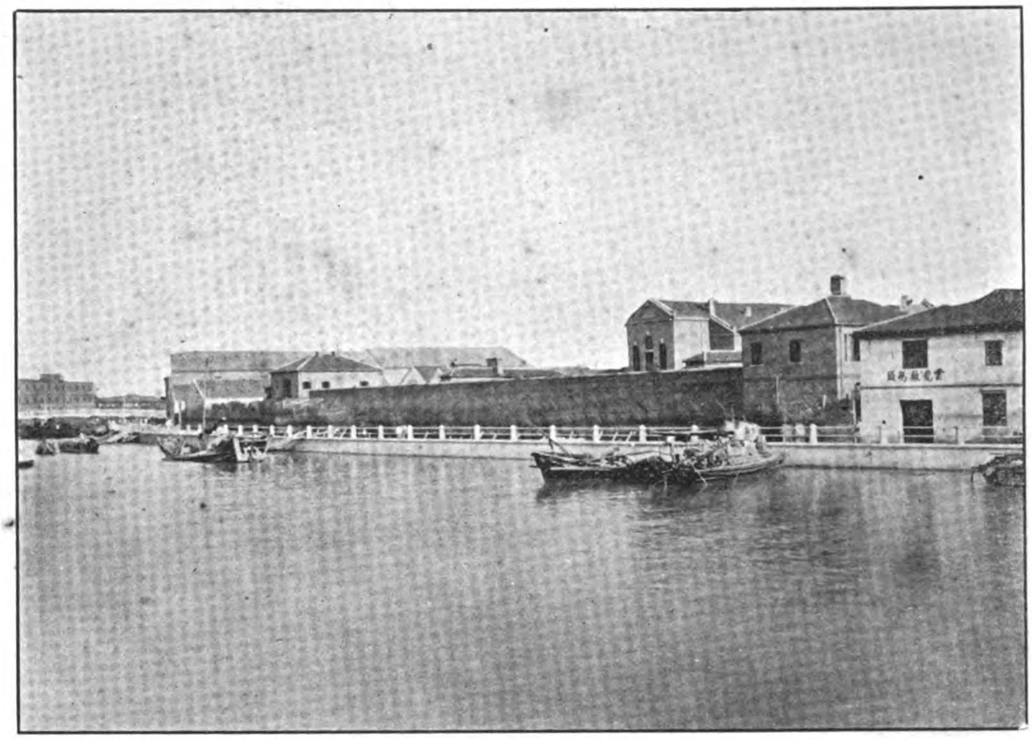
VOL. II. MANILA, P. I., JUNE, 1905. No. I.

MUNICIPAL IMPROVEMENTS IN SHANGHAI SETTLEMENT

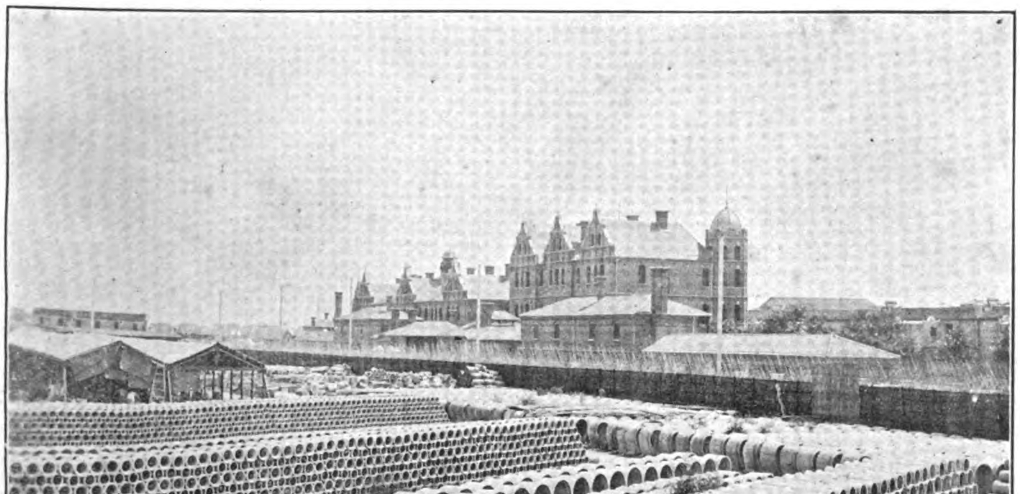
(Mr. Charles Mayne, M. Inst. C. E., Surveyor and Engineer.)

In his sixteenth annual report to the Shanghai Municipal Council for the year ended December 31, 1905, only recently made public by that body, Mr. Charles Mayne, M. Inst. C. E., Engineer and Surveyor of the Settlement, gives a comprehensive and thorough résumé of the public works which have come under his direction during the period. Mr. Mayne's department is the most important branch of the municipal administration, and only the lack of sufficient revenue keeps the expenditures down to the present figure. Shanghai is a rapidly growing city, destined to become the New York of China, and public improvements of today must be planned with reference to this growth; the work of this department is, therefore, of interest. In his introductory remarks Mr. Mayne says:

"A glance at the list of Municipal Properties will give some idea of the growth of the Settlement, all the buildings enumerated, with the exception of the old municipal offices and Hongkew police station, having been erected during the last decade and a half. The approximate value of the land and buildings may be taken at about Tls. 3,500,000. This represents rather a large amount in public buildings, but perhaps the rapid development of the Settlement has warranted it, and it must be remembered that in other places all or a portion of the cost of some of the works would be borne by the State. I think, however, that now so much has been done, the expenditure under this head should be kept down and more funds devoted to other public works. The discussion of the tramway concession will undoubtedly bring the question of the permanent and impervious paving of the carriageways of the main thoroughfares forward once more. The matter has been frequently referred to in my annual reports, and I need hardly say that the day of macadam with its continual maintenance is over in such streets as the Bund, Nanking, Road, etc. Bridges and bundings require more expenditure. Good and reliable wood is difficult to obtain and is gradually becoming dearer. The wooden bridges and bundings as they wear out should be renewed in steel, concrete, or re-inforced concrete. The expenditure on road extensions and widenings has been kept considerably below the amount appropriated. Our neighbors in the French Settlement are keenly alive to the necessity of developing road extensions, and for this purpose they have not hesitated to raise substantial loans. Not only are the roads being metalled, but water mains are being put in and lighting as well, opening up the district for immediate residential purposes.



CONCRETE BUNDING—SOOCHOW CREEK



CONCRETEWARE FACTORY

The total departmental expenditure authorized in the Budget, including ordinary and extraordinary expenditure, was Tls. 901,831, and the actual expenditure amounted to Tls.817,287, as against Tls.1,093,464 in 1903.

The most important works completed during the year were as follows:—Gaol, completing the women's block; municipal hospital; Bubbling Well police station; public school for

(Continued on page 4.)

FAR EASTERN REVIEW

COMMERCE :-: ENGINEERING :-: FINANCE

A MONTHLY REVIEW OF FAR EASTERN TRADE, FINANCE, AND ENGINEERING. DEDICATED TO THE INDUSTRIAL DEVELOPMENT AND ADVANCEMENT OF TRADE IN THE PHILIPPINES AND FAR EASTERN COUNTRIES.

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MANILA AND SHANGHAI, JUNE, 1905

PUBLISHER'S ANNOUNCEMENT

We beg to inform our readers and advertisers that we have opened a branch office in Shanghai, with temporary headquarters at No. 5, The Bund.

THE EXCLUSION TREATY.

China has been visibly agitated the last month by public discussions of the Exclusion Treaty, and an attempt has been made towards creating national resentment to the United States, and a combined boycott on American products. Meetings of guilds and chambers of commerce have endorsed this mode of bringing the American Government to terms, and for a time it really looked as though the movement might assume serious proportions. Fortunately, the arrival of our new Minister, Mr. Rockhill, at this juncture, gave him an opportunity to explain matters, which apparently has had a good effect pending the final settlement of the terms of the new treaty.

The Chinese do not seem to object to America's policy of excluding the coolie class, so much as the exactions and indignities placed upon commercial men, students and others outside the restrictions of the present treaty. Mr. Rockhill has assured the Chinese that the new treaty will be more liberal in regard to these classes, and in support of the Minister's assurance the Secretary of War, Mr. Taft, comes out along exactly the lines defined by Mr. Rockhill. Mr. Taft, being the Administration's mouthpiece in the Cabinet, speaks with the authority of the President.

The whole trouble from the American standpoint lies in the fact that fraudulent certificates are issued by the Chinese authorities which give the coolie the standing of a student or merchant, which entitles him to admission. These certificates are indorsed by our Consuls in China, who are forced to take the word of the Chinese official as to the standing of the holder, as they have not the machinery to undertake an investigation of all certificates.

The policy of the United States towards China has for its sole object the cultivation of closer and more cordial relations. The acquisition of territory, municipal concession, or other infringements on China's integrity, have always been absent from its diplomacy. The attitude of the United States towards China has had the lime-light of publicity thrown on it during the last year,—the preservation of her neutrality and integrity being the keynote. The friendly attitude is emphasized by the recent proposition of President Roosevelt to repay to China the indemnity imposed after the Boxer troubles, if the money would be employed for educational purposes. Only the small actual cost of the American end of the allied expedition, amounting to about $3,000,000 is to be retained. The United States stands ready to forego the further collection of the indemnity, if it will result in benefiting and uplifting the people.

Chinese sentiment is rapidly swayed and we see behind the scenes other influences at work to discredit and discourage American prestige in China. The astute Chinaman, at heart intensely commercial in his ideas, has been led astray in the present instance. It is true that a national boycott against American products might inflict temporary losses on a few firms and steamship lines, and that other countries might well supply boycotted articles, but the Chinaman, in his eagerness to be led by our cunning detractors, has failed to consider that a boycott is like a double-edged sword —cutting both ways. While China might be able to exist without American products for a while, we are willing to hazard the conclusion that her merchants, if confronted with the loss of the American market for Chinese goods in retaliation, would soon cry enough.

THE SHANGHAI TRAMWAYS.

Shanghai will have the long-looked-for electric tramway at last. The final obstacle was removed on June 6th, when a general meeting of taxpayers was held to consider the advisability of selling the municipal electric plant to a syndicate represented by one of the bidders for the franchise. One of the conditions on which the granting of the concession pivoted, was the purchase of power, for operating the proposed system, from the existing municipal electric light plant. In other words the bidders for the concession were to construct and operate the road and allow the authorities to retain control of the current for commercial light and power purposes.

The successful bidders on these lines turned out to be Messrs. Bruce, Peebles & Co., the electrical firm of Edinburgh, and they met every proposal of the Municipal Council with apparent satisfaction, so that at last the latter decided to make the Edinburgh people a firm and final offer to close the deal.

At this point one of the unsuccessful bidders, on the original specifications, proposed a new scheme, which, from our viewpoint, appears to be based on good, sound business principles. In effect they offered a large price for the municipal plant, so as to gain control of their source of power and combine the two elements which make for the success of a profitable street railway, and issued a call for a special meeting of the taxpayers to discuss the matter, and in the event of favorable consideration, to authorize the Council to sell the plant.

All this appears quite reasonable from our standpoint, the question of municipal control to the contrary notwithstanding, as the control of the station is imperative for a high-class tramway service. This action naturally called down on the originators the wrath of all the friends of Messrs. Bruce, Peebles & Co., and despite the fact that the firm responsible for the proposition is one of the strongest and most respected in the Far East, and liberal supporters of the local press, their cold business proposition was met by all kinds of charges of unfair dealing, "snivvy" methods and similar disparaging words. To an impartial outsider this treatment seems manifestly unfair to the firm in question, as pending the final award of the concession, it had a perfect right to submit a counter proposal. It looks harsh to criticize such a firm, and the eminent engineers it represents, by charging it with "snivvy" practice.

It appears, however, that this attitude is more readily explained when we note that Messrs. Bruce, Peebles & Co., in anticipation of the contract, engaged large advertising space in each local paper, and comment naturally favored their side. The result of the ratepayers' meeting was a painful snub to the offer of the syndicate to purchase the municipal plant, and the gibes of the press added insult to injury. The successful bidders have apparently conducted the affair with all due rectitude, and are entitled to the award which will be theirs, but there is no earthly reason for slinging mud at the unsuccessful firm, who also made an honest effort to win the prize. The question settled down to one of municipal control *versus* private monopoly, and the former seems to have won out. How the successful operation of the road can be accomplished, and controversies avoided, is a puzzle.

The scheme is a unique one. As it stands the public's welfare for the proper service of the tramways, lies in their own hands, as they control the generating plant. Nearly all troubles which make for bad service, stoppages of the line, etc., are traceable directly to the power house. Poor service means a loss of good will and consequent damage, not to the plant, but to traffic. In case of such a question arising, its adjustment will be a tedious one. There is nothing to prevent the tramway company claiming damages from the generating company in such a case. The working of the deal will be watched with interest.

In the meantime work will be started, and material results accrue to the city.

PHILIPPINE LUMBER

Two items for the lumber interests of the Philippine Islands appear in the annual report of Mr. Charles Mayne, Municipal Engineer of Shanghai.

With reference to the maintenance of bridges and buildings, he states that this work will require an increased expenditure for the current year, and that "*good and reliable wood is difficult to obtain and is gradually becoming dearer.*" The only alternative against the further use of these expensive woods, is in the employment of steel, concrete or reinforced concrete, and Mr. Mayne very wisely recommends to the Municipal Council that in future, as the wooden bridges and buildings wear out, they should be replaced by the more modern and *cheaper* materials.

Further on in his report in comparing the cost of the steel bridge, with a life of forty years, and a wooden one, with a life of twenty years, he shows that the former will cost Tls. 1344 and the latter Tls. 2786 if Tasmanian timber is used. "*The figure would be considerably higher if the wood had to be obtained from Manila.*"

Some time ago, in conversation with one of the most noted engineers in the Far East, he stated that he was drawing up plans for a big bunding and pier job, and although he preferred to use Philippine hard wood for the pier piles, their high and exorbitant

cost absolutely prohibited their use, and much against his desire he was forced to recommend the use of concrete piling. The work is now in course of construction, using the latter method.

These two examples are to the point. Something is wrong with the situation in the Islands, where a fine market is allowed to slip away. To the forestry tax, the excessive freight charges, together with a lack of modern methods, is attributed the slow advance of the industry, but if Tasmanian and Australian lumber can be marketed in China at a profit, it would seem that there is some hope in futu-e for the upbuilding of this important branch of Philippine resources.

ODIOUS COMPARISONS.

The decisive battle of the Sea of Japan has been fought and won by the Japanese. Russia's sea power has been annihilated, and her prestige shattered. Togo's victory was complete, and the applause and admiration of the world is his. No one can grudge him the honors so valiantly won.

The event has been the natural subject for editorial comment throughout the world, and especially so in the Far East. The dominating influence controlling the daily press of this part of the world is British, and sympathy for their ally is both natural and right. American opinion has also followed the natural trend of Anglo-Saxon sentiment for the sturdy little Islanders, as the nominally weaker side, which, coupled with the fact that they have right and reason in their favor, and are fighting for their national existence, compel American sympathy. International politics, or the question of races, have not entered into American sentiment, and the success of Togo is hailed as a just tribute and a natural outcome of the high efficiency of his fleet and the man behind the gun.

Viewing the victory from this standpoint, we are loath to concede that the Russian defeat should be considered as a typical issue between the yellow and the white race. This impression is gained from some of the editorials of our Oriental contemporaries, who, in the endeavor to adequately sing the praises of Togo, have apparently lost sight of their customary pride of origin, their traditions and ideals, and have "slopped over" to the extent that we read in so many words that the battle is one which must be taken as representative of the fighting qualities of the two races, and conceding the superiority to the yellow.

This is "tommy rot" of the worst kind, failing to benefit the Japanese and creating a misleading impression among the millions of Chinese readers, who eagerly grasp at just such remarks to justify their contempt for the "foreign devil" and incite them to further attempts to sweep us into the sea. We must take exception to such arguments as not only belittling the European and American, but unfair to Japan, who is placed in a false light.

The white race has its extremes, the highest type and the lowest, and among the latter must be classed the average Russian peasant. He was never a sailor, and only years of patient development can place him on a plane level with the type whose genius and skill have made the modern battleship possible, not only to construct but to handle, and who have taught the other race the intricacies and mysteries of modern war. With this thought in mind, to compare an issue between the Japanese and Russians as indicative of the inferiority of the white race is unfair to the representatives of the higher type. We see no urgent necessity, as inferred from perusing a certain editorial, for expressing the prayer or hope that Japan will exercise due restraint and nobility, following such a victory. Such an utterance is indicative of fear and presupposes arrogance and pride in the victor.

We have no fear for the future of the white race, notwithstanding the "barbarism" of the other, combined with their skill and science in battle. This latter remark hardly flatters the Japanese, after the manner in which they have conducted the war, but even admitting the "barbarism" or innate savagery of the yellow race to contend with, we might state from the standpoint of the higher type of the white race, that we have had ample practice dealing with barbarians not one whit less courageous; and, when it comes to the point, we have as much of the "old savage" in our fighting makeup as the other.

"Scratch a Russian and you will find a Tartar" still holds good, but scratch the other type and you will find a different kind of Tartar, when occasion demands. We remain true to the ideals which developed the XXth Century white man; we revere the traditions handed down and the examples set for us by worthy ancestry; we remember the wars of the centuries,—the American Civil War, waged on a scale grander than the campaign in Manchuria, outrivaling it in ferocity and grim disregard for death; we remember the war of our brothers across the sea, the magnificent exploits of Napoleon, of Wellington, of Von Moltke, the charge of the Light Brigade at Balaklava, and the countless similar episodes characterizing the fighting qualities of our race. We know the individual resource—fullness of our type in battle, and his willingness to sacrifice his life for his country when the time comes; we know that our fleets are keyed up to the highest pitch of efficiency, and behind it all we know that the same good old red fighting blood flows through our veins, as quickened the pulses of the heroes of these past struggles. And we resent the comparison based on the failure of Rodjestvensky to gain the victory. With all due respect and admiration for the fighting qualities of our yellow brother as typified by the Japanese, we must still adhere to our convictions that the victory was one of skill, aided by torpedo boats and submarines, and all things considered, the courage displayed by the vanquished was of an order equal at least to that shown by the victors.

Comparisons are odious, especially at the present time, and remarks derogatory to the dominant race, even by inference, should be deprecated. Comment of this character will make towards a rift between the races, ultimately widening into a chasm, which can only be bridged after the question has been put to the final test. If there is a yellow peril, Europe may well tremble if our race fails in Russia. Russia is the bulwark of Europe, and only over the graves of her millions can the tide sweep through. We are confident, however, that the lesson of the present war will have its effect on the darkened Empire. We will find that the bulwark of the white race will be that same Muscovite peasant, quickened and developed by the XXth Century march of civilization.

INSULAR LABOR QUESTION

In the introduction to the bulletin on the population of the Philippines, by the Director of the Philippine Census, Brigadier General J. P. Sanger, just published by the Census Bureau at Washington, attention is given incidentally to the question of the industrial capacity of the Filipinos, but this appears chiefly in some extracts from statements of Secretary of War William H. Taft when he was Civil Governor of the Islands. After speaking of the general characteristics of the natives it is said with respect to the possibility of obtaining satisfactory labor from Filipinos that "experiments have shown that those who have gone about the matter systematically and have attempted to find out what the native needs to keep him constant in his attendance upon work have been successful, so that, wages considered, his work has been fairly satisfactory." Secretary Taft said in this city, when he was still Civil Governor, that he was "emphatically opposed to the general policy of admitting the Chinese," first, because the Filipinos have the strongest opinion that it will be for their detriment; secondly, because he believed that the history of the Straits Settlements showed that it "will be for their prosperity as distinguished from the material prosperity of the Islands." He was opposed to admitting Chinese labor "until it shall be made to appear that the great works of construction which are essential in the Islands cannot be carried on satisfactorily with Filipino labor." He cited some instances of its successful employment and pronounced them "sufficient to sustain the fact that Filipino labor, when properly managed, can be made to do the work the Philippines require, not so well as American or Chinese labor, but fairly well."

These opinions were expressed two years ago, and there has been no intimation of a change of view since. Whether well-founded or not, it seems to be the policy of the American Government to insist upon the exclusion of Chinese labor from the Philippines and depend upon the natives for the industrial development of the Islands.

This apparent determination of the American Government to exclude Chinese laborers not already in the Philippines, and to prevent all introduction of contract labor from the outside, for the purpose of giving the natives the opportunity and the benefit of doing their own work, makes it all the more important to remove every difficulty and obstruction out of the way of capital and enterprise, so far as practicable, in its efforts to build up industries and trade.

JAPANESE ELECTRICAL MACHINERY.

During the World's Fair, held at St. Louis last year, much interest was shown in the few pieces of electrical apparatus exhibited in the Palace of Electricity by Japanese manufacturers. Telephone and telegraph apparatus and other small appliances were shown. Besides, there was a continuous-current dynamo and a testing transformer for 150,000 volts. Naturally, the machines exhibited there were not large, for they had been shipped a long way; but the Japanese have been building fairly large electrical machinery for some years past. It is particularly interesting to consider that these machines have not only been built by Japanese labor, but have been designed by Japanese engineers. Although the engineers who designed them were trained in foreign technical schools, and the companies have, of course, profited by the experience of others, the machines themselves stand as a product of Japanese skill and industry.

The small cost of manufacturing electrical machinery in Japan is a matter that deserves special consideration in connection with the market in the Orient. It is said on competent authority that electrical machinery can be turned out in Japan for 30 per cent less than the price for which the American manufacturer can deliver similar apparatus in Japan, and the question is asked what can these Japanese manufacturers do with thoroughly up-to-date equipment, with which their factories are not at the present time provided? As one illustration of the methods used in Japan, it is said that the insulation of the wires is all wound on by hand, one man drawing the wire through a winding machine while the other wraps on the insulation. When a double thickness is required, this process is repeated. This is a slow method, and in America would be expensive. On the other hand, the Japanese have the faculty of doing things thoroughly and conscientiously, and, as skilled labor is cheap, it is probable that all the work is done in a first-class manner.

Another point of interest is the statement that the iron and steel used in Japan are secured in England. One may ask why this should be so when America is able to compete with the English manufacturer in his home market. The trip by water from the Atlantic coast to Japan is not much longer than from England to the same country, and a slight difference in time is a matter of no consequence.

Japan, at the present time, produces her own copper and mines her own coal. She is developing large iron mines in the northern island of Hokkaido. Thus, in addition to cheap skilled labor and plenty of it, she expects, within a few years, to have cheap raw material. She will then be in a position to compete with American and European manufacturers for the electrical trade of the East, and it is difficult to see how she can be prevented from getting the lion's share of it.

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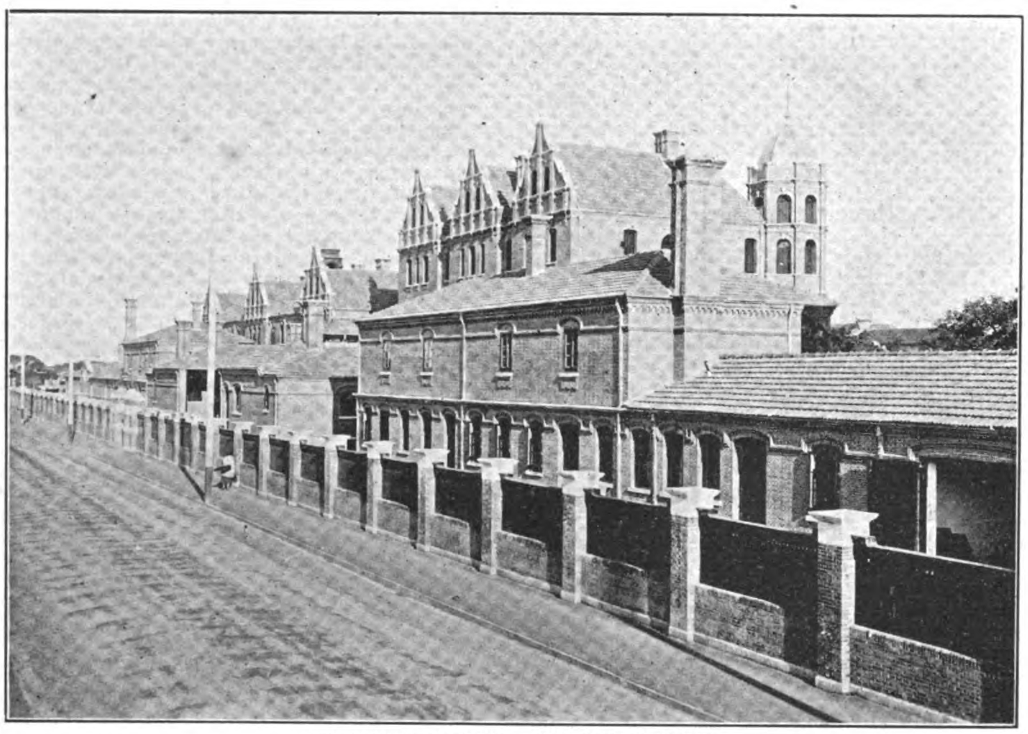


MUNICIPAL HOSPITAL (NORTH FRONT.)

MUNICIPAL IMPROVEMENTS IN SHANGHAI SETTLEMENT

(Continued from page 1.)

Chinese, and volunteer headquarters. At the time the report was prepared the large police station for the Sinza District was also nearing completion.

Mr. Mayne deals exhaustively with other public works.

ROAD EXTENSIONS AND WIDENINGS.—The expenditure on these works has been kept considerably below the amount appropriated, which Mr. Mayne thinks is regrettable, taking into consideration the rapid growth of the settlement and the extreme desirability of acquiring roads in rapidly developing districts.

FUTURE PUBLIC WORKS.—After dealing with the Tramway Concession, four tenders for which were received at the end of March, the Engineer and Surveyor recommends that the Garden Bridge, with which the question of tramways is closely connected, be rebuilt of steel, and he says that on account of the damage being done to Soochow Creek by the present wooden bridges there is no doubt that they, too, should be replaced by suitable steel bridges with clear spans over the fairway.

The following figures are given by Mr. Mayne to show the approximate cost of erection and maintenance of a new Garden Bridge, 50 ft. in width with spans over the fairway, to comply with the latest requirements of the harbor authorities, which call for a minimum span of 55 ft. over the fairway, in the event of a wooden bridge being erected:—(1) *Steel Bridge*.—Life 40 years; estimated cost Tls. 205,000; sinking fund, 6 per cent, Tls. 1324.71; general repairs and maintenance, at 1½ per cent per annum, Tls. 3075—Tls. 4399.71. (2) *Wooden Bridge*.—Life 20 years; estimated cost, Tls. 102,600; sinking fund, 6 per cent, Tls. 2789.18; general repair and maintenance at 3 per cent per annum, Tls. 3078—Tls. 5867.18.

These estimates are not based on detail drawings, but are sufficient to show the relative cost. The prices for the wooden bridge are based on Tasmanian timber, and according to Mr. Mayne the figure would be considerably higher if the wood had to be obtained from Manila.

The original Garden Bridge was erected about 31 years ago and may be said to have been wholly rebuilt since that date. The original cost is given at Tls. 513 for a bridge 37 ft. in width.

BUNDING AND RECLAMATION.—The concrete bundings on the Soochow Creek have been more or less delayed for financial reasons, and work on the section on the north side between the Garden Bridge and Szechuen Road Bridge has been suspended altogether. In view of the fact that the tramways are almost certain to go along the North Soochow Road, and that it would be highly desirable to widen it, Mr. Mayne thinks the work should be continued without further delay.

An area of about 8 mow is to be added to the Public Garden by means of a further reclamation from the Soochow Creek. The plans for the scheme have been approved by Mr. de Rijke (eminent hydraulic engineer), and the necessary mud (about 40,000 tons) for raising the ground will be obtained by dredging the bank opposite the German Consulate. The work has already been commenced, the whole of the bunding having been put in and the stone slope partially formed. It has also been decided to take off a strip of the Garden in order to widen the Bund to 60 feet.*

* Just completed June, 1905.

MISCELLANEOUS WORK.—Among the miscellaneous work may be mentioned the partial completion of the removal of the old 3' 9" x 2' 6" sewer and the substitution of a 3' 0" circular re-inforced concrete tube sewer in the Broadway. This was a most difficult and anxious work on account of the narrowness of the street (36' 0" including footways) and the height of the adjoining buildings. The ground was also extremely soft, and to make matters worse the Waterworks Co.'s two 20-inch pumping mains, which supply the whole of the Settlement with water, ran parallel to the sewer trench and only about 3' 6" away from it. The mains were temporarily slung on chains and afterwards underpinned with cement concrete. Extreme care was required when working near the water mains, as a leak in either of them would have caused the collapse of the houses on both sides of the road, besides cutting off the Settlement water supply. The old sewer leaked so badly that when it was filled with water at each flood tide the sewer trench was flooded, and the 5-inch centrifugal pump was not sufficient to keep down the water, a steam pump having to be borrowed from the Fire Department. The work, however, was successfully completed, the men working in three shifts in order to hurry it along.

Considerable alterations, involving heavy and troublesome foundation work, have been carried out for the Electricity Department at the central lighting station.

The landing accommodation on the Bund foreshore has been very much improved by the erection of two jetties, with bridges and pontoons on each side of Foochow Road.

The new foreign building rules have been in operation for almost a year and have worked satisfactorily on the whole and practically without friction. There is not any diminution in building operations, the submission of twenty sets of plans in a week not being an uncommon occurrence. This indicates the steady growth of the Settlement, but it is a matter for regret that so many plans are prepared and submitted by inexperienced people, entailing considerable extra supervision of the buildings by the Inspectors.

The manufacture of concreteware has fallen off so far as sales to the public are concerned, owing to the large number of small contractors who are making pipes outside the Settlement. Some very flagrant cases of inferior pipes being substituted for council's pipes have been detected during the year, and the public should insist on obtaining an authentic receipt from the contractors when council pipes have been specified,

MUNICIPAL HOSPITAL (SOUTH FRONT.)

BUBBLING WELL POLICE STATION.

Concrete pipe making by hand was first started in Shanghai by this department in 1901 and the work has gradually assumed its present dimensions. It is worthy of note that the department is the first to introduce (this year) machine-made pipes, all the pipes from 12" downwards now being made by special machinery driven by an electric motor. The pipes are superior to those made by hand, being manufactured under pressure.

Mr. Mayne recommends the following new projects for the Council's consideration in the near future:—Rebuilding the Garden, Kiangse Road, Chekiang Road, and Bubbling Well Road bridges; completion of the bunding of the Soochow, Hongkew, and Yangtszepoo creeks; erection of quarters for inspectors and overseers at various municipal depots and district godowns in connection with same; rebuilding the Engineer and Surveyor's office; erection of boundary walls for all police stations; paving carriage ways of main streets with impervious pavements; extension of Haining Road to meet Nanziang main road; an intermediate road to connect the Hungjao and Brenan roads; forming and bridging the Road to the Hills at a cost of about Tls. 29,000; widening of Nanking Road at junction of Kiangse Road; survey and location of a boundary road between Range Road and flour mill at the Eastern boundary of the Settlement; laying out Hongkew recreation grounds; acquisition of land for a public park in the neighborhood of the outer Western District; digging a canal on the West side of the Settlement, with main road alongside, between Soochow and Siccawel creeks, for improved drainage and development purposes; provisions for self-supporting sanitary public bath houses for Chinese; surveys of the districts outside the Settlement, between the Soochow Creek and proposed railway line and between the boundary and rifle range, etc.

BRIDGES.—The total number of bridges in charge of this department is now 64.

A small hardwood bridge with iron railings has been erected across the Seon Zar Pang on Singkeipang Road.

An elliptical arched bridge of re-inforced concrete has been constructed across the Sze Pang at Avenue Road. The span is 20' 0" and the width 30' 0". The soil met with here was very soft, and the foundations of the bridge were of a somewhat special nature on this account.

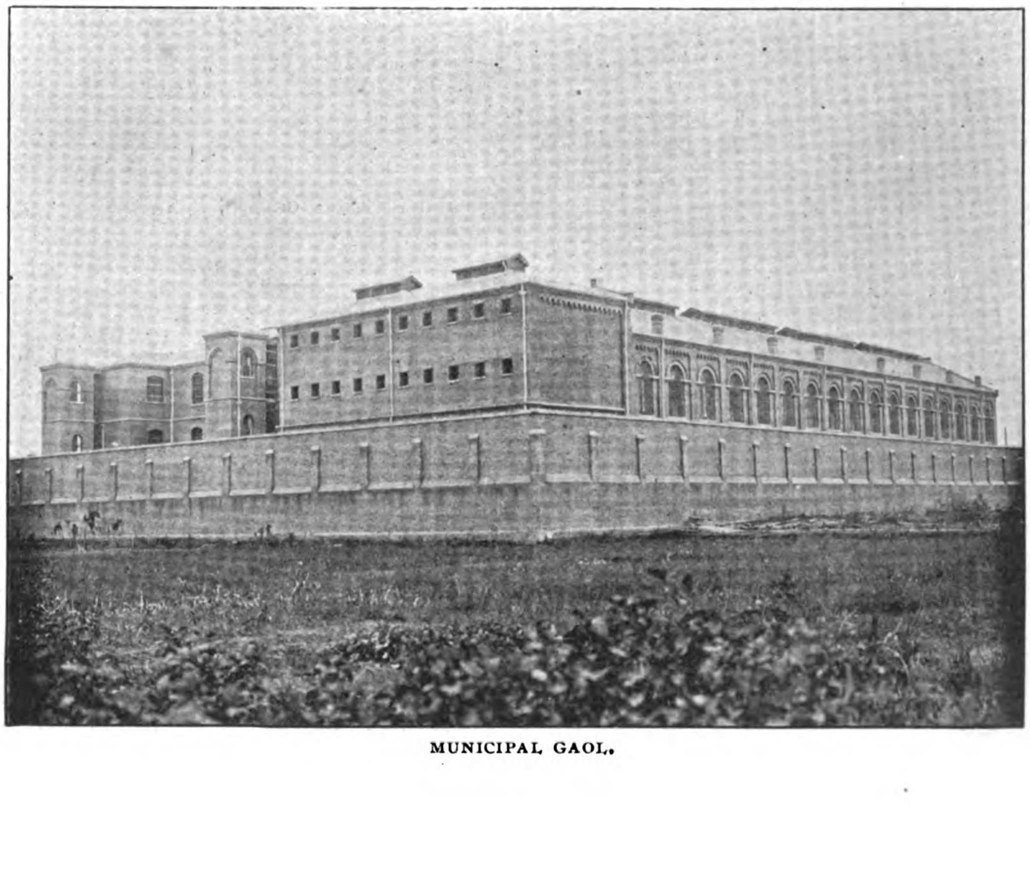
A narrow wooden bridge in Burkill Road, which had become unsafe for vehicular traffic, has been replaced by a bridge 40 feet in width constructed of steel troughing with abutment and wing walls of concrete.

A trussed girder bridge, 50 feet clear span, has been erected across the Rubicon Creek at the end of Hungjao Road. The depth of the girders is 7 feet and the width of roadway 15 feet. The abutments are constructed of 10-inch square hardwood piles. The flooring consists of 3-inch Tasmanian blue gum planks. It is designed to carry the ordinary vehicular traffic.

Extensive repairs have been made to the Garden Bridge, Chapoo Road Bridge, and Thibet Road Bridge.

BUILDINGS.—*Municipal Hospital.*—The buildings comprise the following:—Ward block, administration block, receiving rooms, kitchen and watchman's room, laundry and ambulance block, disinfecting rooms and mortuary, doctor's residence and inquest room. Total accommodation, 36 beds. The ward block is a two-story building and contains on each floor a men's ward for 6 beds, a women's ward of 4 beds and 8 rooms for private patients, all these being on the south side of the building. On the north side, and separated by a corridor running the entire length of building, are the bath-rooms, sink-rooms, serveries, nurses' room, store, etc. The administration block is a three-storied building; the ground floor contains the matron's room, office, nurses' dining and sitting room, waiting-room, dispensary and store. The first and second floors are entirely taken up with the matron's bed-room and private bed-rooms for 14 nurses, the bath-rooms, box-rooms and store being on the north side of corridor. The receiving block, a one-story building, stands on the left immediately on entering from Range Road, and consists of 3 small observation wards with verandah, also small servery, bath and sink rooms, etc. On the right of the entrance gates a one-story building contains a large kitchen to supply the whole of patients and staff, also pantry, scullery and cold store, a room is also provided to accommodate the gate watchman. The laundry building contains large wash-house and laundry, stabling for 3 horses, ambulance house, servants' (native) bath-room, dining-room and kitchen; a portion of this building being carried up 2 stories wherein are provided bed-rooms for servants. The mortuary building contains separate cells for 16 dead bodies, ranged in sets of 8 on each side of the mortuary-room. This in future will be the Shanghai public mortuary, with separate entrance from Fearon Road. The west end of this building consists of rooms for infected and disinfected clothing, a "Thresh" disinfector being built into the wall dividing the two. A store for disinfectants adjoins these rooms, over which are built 3 small rooms for coolies' bed-rooms. Doctor's Residence and Inquest Room.—This building stands at the east end of the site and contains a large inquest-room, waiting-room, lavatory, and private entrance for jurors. The remainder of the building is divided into two residences, one for the resident doctor and the other for a sanitary inspector. They each contain sitting-rooms, 2 bed-rooms, and the usual appurtenances. The various buildings have been designed with the view of future extension, and space has been left for the west ward block whenever it may be necessary to provide further accommodation; when such a time arrives it is hoped it will not be found necessary to alter or extend any of the administrative buildings in any way. The ward block, administration block, kitchen, and observation

(Continued on page 16.)



MUNICIPAL GAOL.

FORESTRY DEVELOPMENT OF THE PHILIPPINES

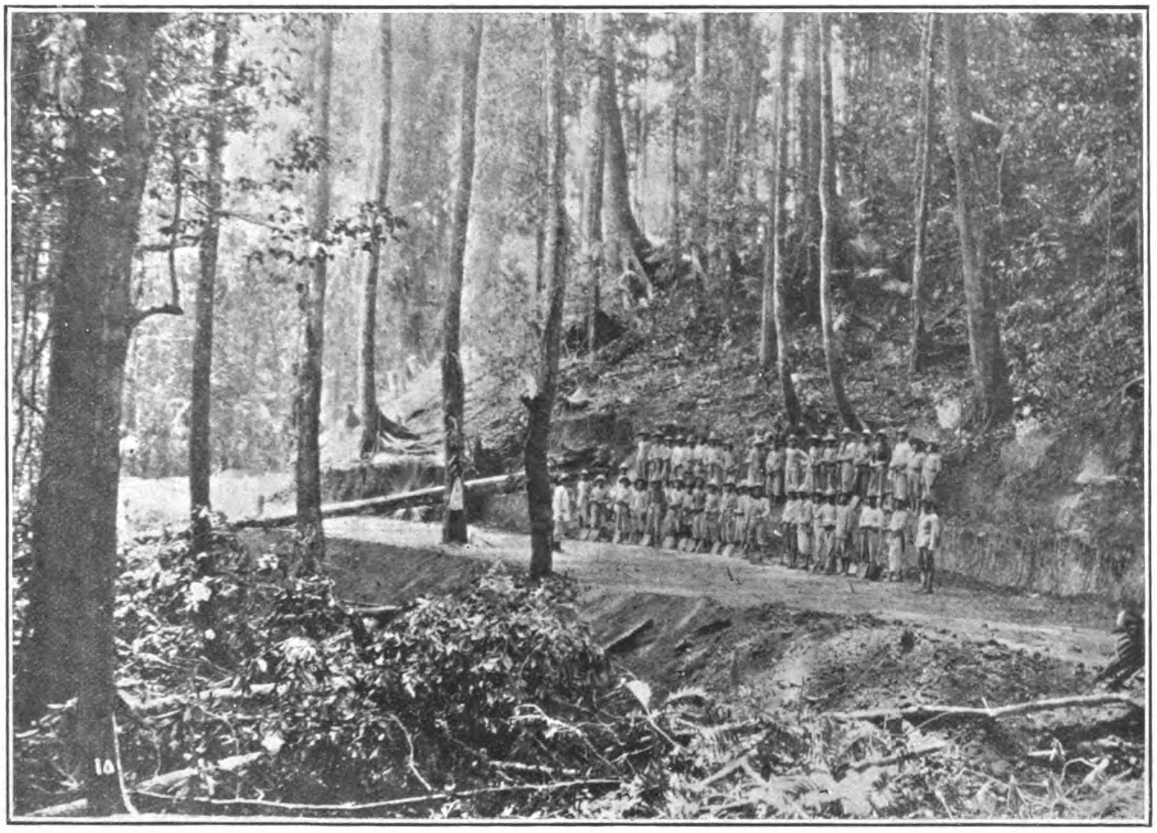
The annual report of Captain George P. Ahern, 9th U. S. Infantry, Chief of the Bureau of Forestry of the Philippine Government, covering the period ended August 31st, 1904, which has just been given to the public, contains many interesting facts with reference to the forestry of the Islands and its development.

Captain Ahern notes several important changes in the Forest Act, which it is confidently hoped will give an impetus to forestal development. Not the least of these is the reduction of the tariff on forest products of about 35 to 60 per cent; the rearrangement of the native woods into four groups; elimination of a "superior group" (a classification in continual conflict with "first group"); the adoption of the metric system, in conformity with the revised United States Statutes and with similar action on the part of the most advanced nations; the division of the provinces into two classes, "A" and "B;" and granting licenses for a period within the discretion of the Secretary of the Interior and the marking of timber for felling within these areas. In marking, an attempt has been made to limit the cutting of superior and first group woods and the removal of a certain per cent of inferior species. In this connection Captain Ahern says:—

"It is only by some method of selection, by competent forest officers, that the forest conditions of the Islands can be improved, since to allow the indiscriminate cutting of the better grade woods, would soon cull the forests of desirable species and leave them composed only of trees of inferior classes which have but little market value, and which in many cases due to the heavy transportation charges, can not be put upon the market except at a loss. In places where much cutting has been done in the past and where certain species are liable to extermination under present lumbering methods, the felling of such species may be prohibited for a certain length of time, or the amount cut curtailed for a period of years, in order that the forest may have time to again recover.

"The forests of these Islands are unlike those usually found in temperate climes, in that no one specie, excepting the genus *Pinus*, is gregarious; that is, found in pure stands. The general rule is that on any one acre a great variety of tree species, eight inches and over in diameter, is found, with but few members of each species represented. Such forests are naturally operated as 'selection' forests—that is, forests in which clear cutting does not take place, and the lumberman seeks for cutting desirable trees which he finds scattered here and there. Such trees are usually those of middle diameters, from 24 to 40 inches, thus leaving in the forest only young trees, too small to cut, and overmature trees which are generally defective and which should have been the first ones removed as the timber in the same becomes less valuable each year.

"Under the native methods of lumbering, after the felling of the medium-sized trees of the desirable classes, we generally find left on each acre a great number of trees which are of little mercantile value at the present time. These present a serious difficulty in that these trees frequently bear a great quantity of seed and at an earlier age than do trees of the better species. In marking and selecting trees for felling the forester attempts to avoid the bad effects above mentioned by insisting upon the removal of as much of the poorer grades as possible, and attempts to aid the reproduction of the better species in every reasonable way."



BUILDING A ROAD THROUGH THE FORESTS, NEAR ATIMONAN, TAYABAS PROVINCE.

Chief of the Bureau, for a period not exceeding twenty years.

Forest maps of five forest districts, comprising the Provinces of Bataan, Zambales, Tayabas, Ambos Camarines, Mindoro, and Masbate, have been made in detail, and the limit of public forest granted to each holder of a timber license shown thereon. Forest maps of nine other provinces have been made with less detail, and, in time, forest maps, on a uniform scale, will be made of all provinces. Copies of maps, such as the above, are sent to forest officers for their information, and for additional notes and corrections which they may be able to make. By this means the bureau expects to make substantial and valuable addition to the knowledge of the location and value of Philippine forest resources.

Division of Forest Management.—The work of this branch of the Bureau of Forestry has been mainly confined to examination of forest areas assigned to various licensees, and

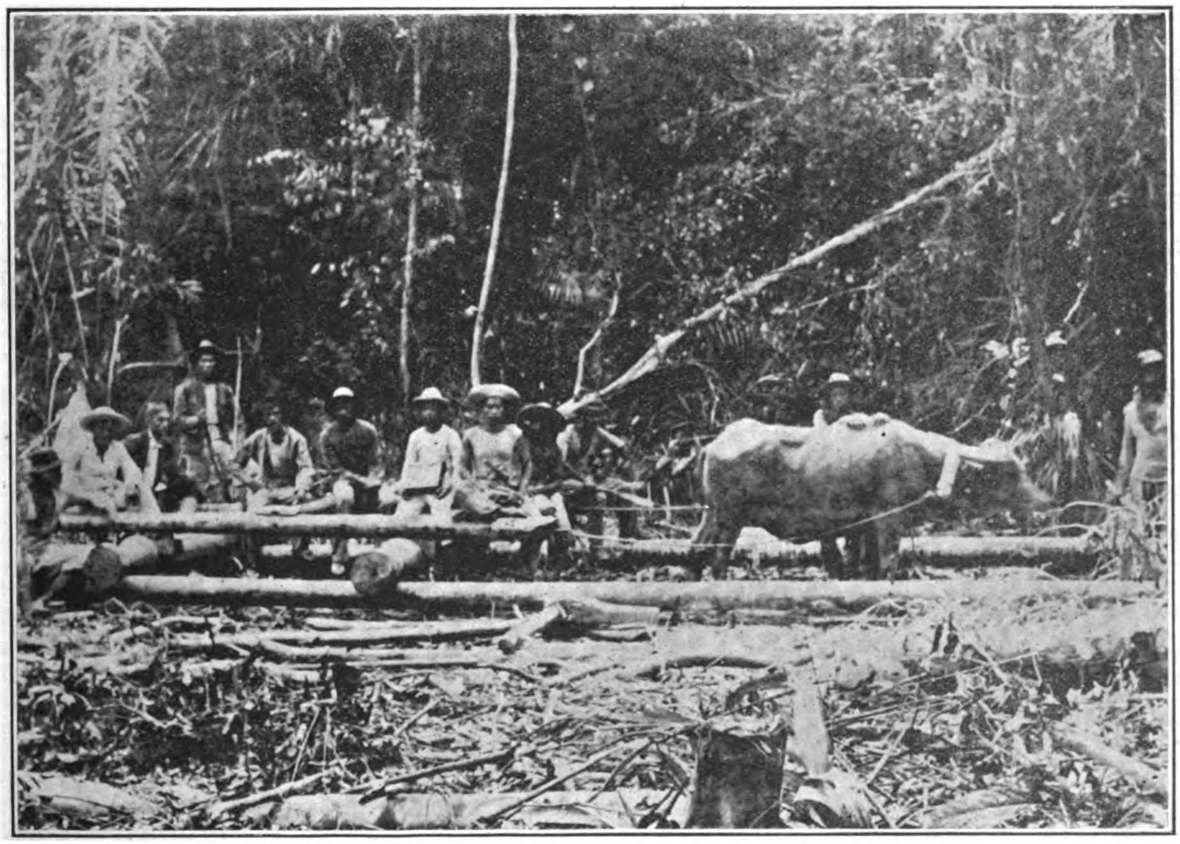
Rational Forestry in Occidental Negros.—The Chief of the Bureau says that as marking the beginning of lumbering operations in the Islands along rational forestry lines, the work of the Iloilo Electric Company in the Province of Negros Occidental, is of interest. This company has erected a mill on the Gimogon River in this province and also has a wire cable logging outfit in the forest on the same river. The operations of the company were inspected in January, 1904, and though operations had been temporarily suspended, enough work had been done up to the time of the inspection to prove the feasibility of the project.

The company at the present time has a mill (capacity, 20,000 feet, board measure, per day) 7½ miles from the mouth of the Gimogon River, to which point a launch drawing six feet can proceed, passing over the bar at the mouth of the river at high tide. This mill consists of one circular saw, with a top saw, one edger, and a saw-filing machine. Timber can be cut, taken to the mill and sawed, at a cost of from ½ to ¾ cents, gold, per foot, board measure, and it is claimed with suitable skilled labor it can be done for less. Freight in lorchas to Iloilo, the company's market, varies from $5 to $6, gold, per 1000 feet, board measure. Government charges for stumpage averages less than $1.50, gold, per 1000 feet, board measure. This timber finds a fairly good sale at from $30 to $35, gold, per 1000 feet in Iloilo, but at a somewhat lower price would sell more readily.

RED MALABAYABAS (*Gardenia sp.)*, PAGBILAO, TAYABAS. ALMOST PURE STNAD OF RED MALABAYABAS AND MACAASIN.

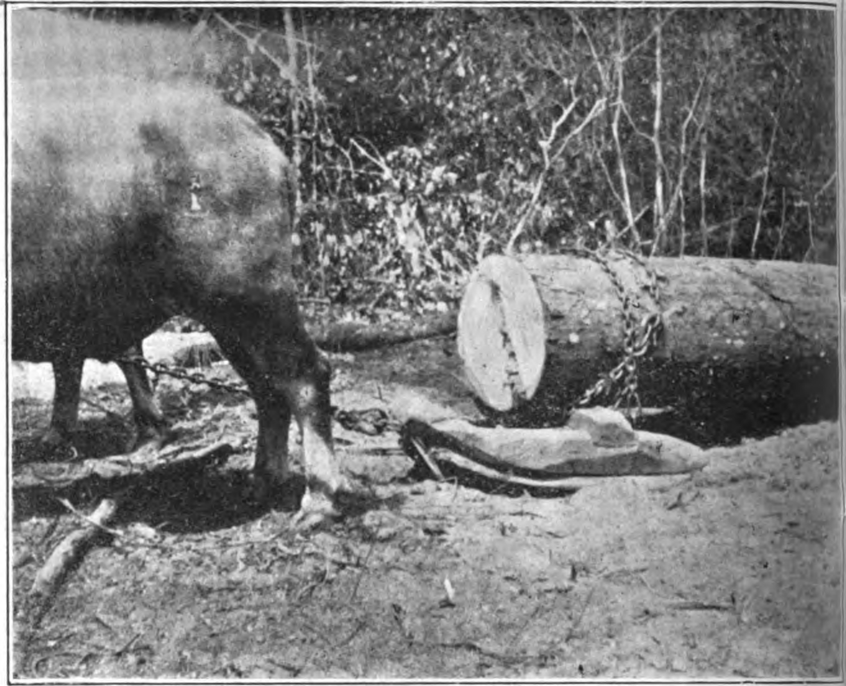
The above price is about the same as similar classes of timber can be secured from other lumber merchants who use whip saws in sawing. In sawing timber it has been found that logs up to 2½ feet are generally sound, but that logs over that size are frequently either partly rotten at the center, or else, as in *balacbakan*, from six to eight inches of the heart is very brittle and of no use except as fuel for the boilers, and a 2x4x12-inch saw drawn from the center of one of these trees will frequently, when supported only at the two ends, break from its own weight.

LOGGING OPERATIONS.—The company started operations in the forest at a point about 8½ miles from the mouth and on the west bank of the Gimogon River. Here a rollway was made, the bank raising almost perpendicularly from the river to a height of 150 feet; much steeper than is desirable. In order to also have the logger available for skidding logs to the main haul, the "donkey" was placed near the edge of the timber, about 1,500 feet due west. This logger is of recent pattern, No. 614, and made by Washington Iron Works, Seattle, Wash. The horsepower of the same was unknown by the parties at the mill. The main cable used for the "donkey" to the rollway is one inch, and the "haul-back" cable three-fourths of an inch; the cable at the rollway passing through a simple block firmly fastened to a stump. Radiating from the "donkey" in several directions are logging trails where timber has been taken out for a few hundred feet back, the longest of these trails being about 1,200 feet, and trees only close to it cut. A three fourths-inch cable is used to skid the timber down to the main cable.



PRIMITIVE LOGGING RAILROAD IN THE CUTTING DISTRICT OF THE ALVISEE LUMBER AND DEVELOPMENT COMPANY, SOUTHEAST COAST OF MINDORO.

SKIDDING LOGS ON SLED WITH CARABAOS YOKED AMERICAN FASHION, MINDORO.



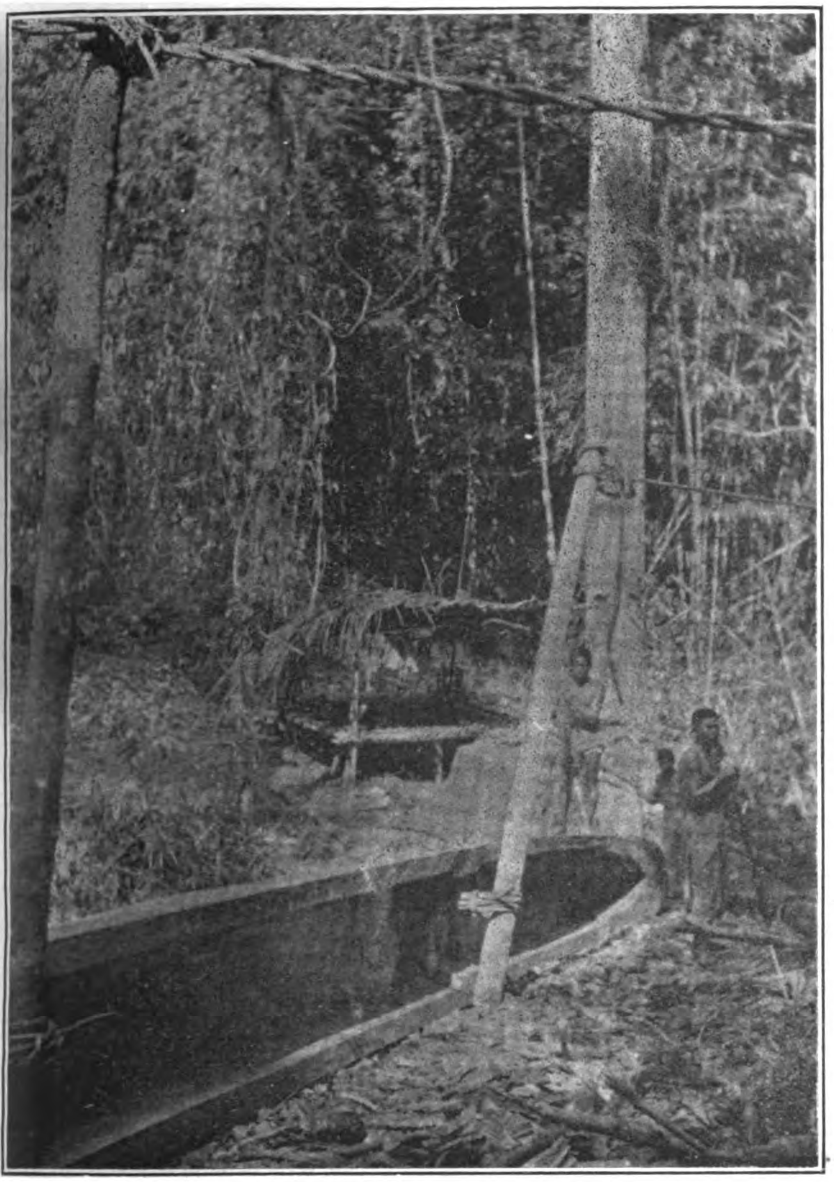
SKIDDING SLED USED BY AMERICAN LUMBERMEN, MINDORO.

VIEW ALONG THE MAIN HAUL FROM NEAR THE ROLL-WAY, SHOWING SKIDDING ENGINE NEAR THE EDGE OF THE FOREST. LOGGING PLANT OPERATED BY INSULAR COMPANY, GIMOGON RIVER, NEGROS OCCIDENTAL.

A much more satisfactory arangement would be a skidding engine, placed on site of present "donkey," to be used in skidding the timber to the main haul, and the "donkey" placed at the rollway, instead of as at present in the forest. As soon as possible this change will be made, but possibly financial difficulties will interfere for a time in securing the additional equipment.

The force in use at the logger when it was in operation consisted of one American engineer; two natives to cut firewood for the boiler; three native water carriers, who transported the water from a small stream about 1,500 or 2,000 feet distance; two cutting gangs of two men each; swampers; eight men at the rollway, who saw up long logs as they come from the forest and then roll them into the river, and a dozen or so general men (the number varying more or less), who dragged the skidding cable back into the forest from the "donkey." This required from 12 to 15 men, according to the distance necessary to drag it. Three carabaos were tried for this work at first, but were not able to haul the cable.

But little timber has been cut in the forest so far, as the "donkey" was placed in an old burn, where a good number of large trees stood, and about all of these were cut. All the trees have been cut at the upper termination of the root swelling, which in cases left them pretty high, but Captain Ahern does not think it justice to the lumbermen in the Islands that the Bureau should require them to cut through the large buttresses in order to secure a lower stump. One present evil is that a large number of poles are cut to build a scaffolding around each tree in order that the sawyers can work some feet above the ground. No attention is paid to the species, and where the larger trees stand fairly dense almost every pole is cut. This practice should be absolutely prohibited, except for woods of the fourth group, and a severe penalty imposed for the cutting of other woods. The merchantable timber in all trees felled has been utilized, but no use has been made of the larger branches. There appear to be a fairly good reproduction of most species where cutting has taken place in the forest, but the saplings and poles have been damaged to quite an extent by the large-limbed trees, when felled. It would seem to be necessary that a minimum diameter limit of 18 inches be established and rigidly adhered to, and that the timber in the future be marked in order that there may be assured a sufficient number of seed trees per acre; this may not, and probably will not, occur it cutters are permitted to select the timber themselves.



PREPARING TO REMOVE A BANCA FROM THE FOREST. BATAAN PROVINCE.

VIEW OF SKIDDING ENGINE USED BY INSULAR COMPANY, GIMOGON RIVER, NEGROS OCCIDENTAL.

In a more or less dense forest such as is found here, where all the mature timber is removed, there remain but few trees, and many of these will be more or less maimed through the falling of the other trees, or else their growth will be retarded by the large trees to such an extent that they will not be available for a few years as seed trees; hence, trees capable of producing seed at present and in abundance must be protected, in order that the blanks may be properly filled with seedlings before weeds and undesirable species have completely covered the space. These seed trees will also be available as shade for the younger growth present.

One man could mark in two weeks a sufficient amount of timber to run the company for at least six months, but it is advisable that an inspection be made of the tract at least four times per year, in order that suitable control may be maintained over the cutting operations.

By measuring the logs before the same leave the rollway the Bureau insures itself against possible loss by floods carrying off timber previous to its measurement, as happened during December, 1903. From 10 to 20 per cent of each of the larger logs are found to be worthless for lumber, and as the Bureau does not secure payment for this, as payment is made on sawn timber, plus 15 per cent, in the opinion of the writer, some scale just to both the interested parties and the Bureau could be devised which would more nearly be adapted to the existing conditions.

In scaling the timber some arrangements should be perfected whereby allowance for defects in timber can be made, and all timber measured in the log at the rollway before ti is put into the river. By making allowance for defects the company can afford to take out more or less defective logs, which otherwise they would leave, and payment for forest charges on the full volume of timber would result in a hardship, due to the general defective character of the center of large logs. The logger so far has taken out from 4,000 to 5,000 board feet per day, but with a competent man to manage the skidding engine a much larger amount of timber could be taken out. Two men can fell and saw an average of two trees, three feet in diameter, per day, the same being four or five log trees. These logs are frequently left in 24 to 36 foot lengths, sometimes longer, and skidded to the rollway, where they are than sawed into the proper lengths of 12, 14, or 16 feet.

The natives have been found to be very apt in learning the work, and received much praise from all Americans under whom they were working. They have also picked up the mill-work very readily and made good mill hands, but they have not a proper regard for the danger attending machinery, and hence must be carefully watched in order to protect them against injury. Wages are paid to all workers at the rate of 65 cents, local currency, per day, without food.

A gratuitous license has been granted to the company for lumber to be used in the sawmill and buildings connected with it, as the mill and necessary buildings are a benefit to the community, and can be considered in the light of general improvements.

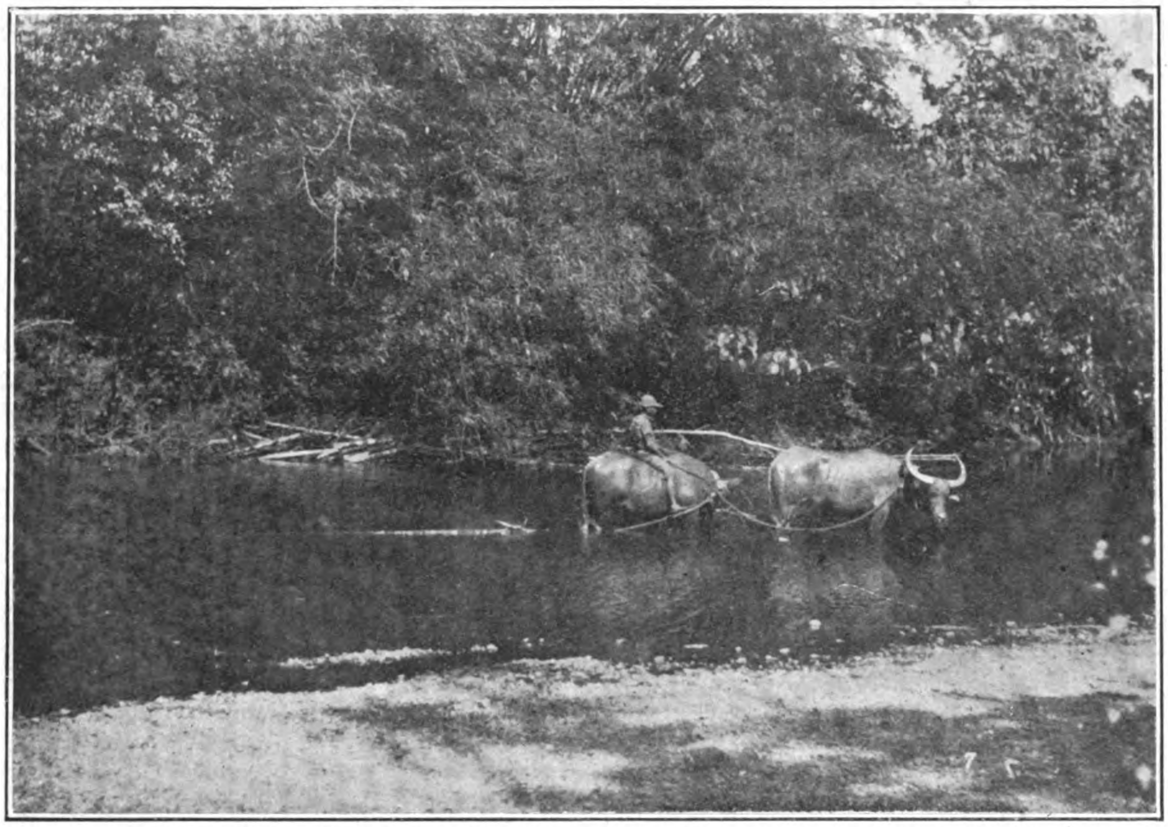
An indispensable part of such a skidding and logging outfit is a machine shop where broken parts of machines can be repaired without a long trip to Iloilo, consuming several days and entailing a large expense. Frequently the parts can not be found in any shop in these Islands and must be made, causing a further loss of time and additional expense. Such a delay has occurred with the machines at this point, and in the near future a machine shop will be added to the equipment.

Parties contemplating the installation of plants should be prepared to fully equip the same with duplicate parts, and have a machinist capable of repairing any part of the machinery. It is very difficult and expensive to attempt to carry on the business in any other way in this country where transportation is deficient, and failure will undoubtedly result unless the subject is very thoroughly investigated beforehand.

(To be continued.)

REDWOOD AND THE ORIENT.

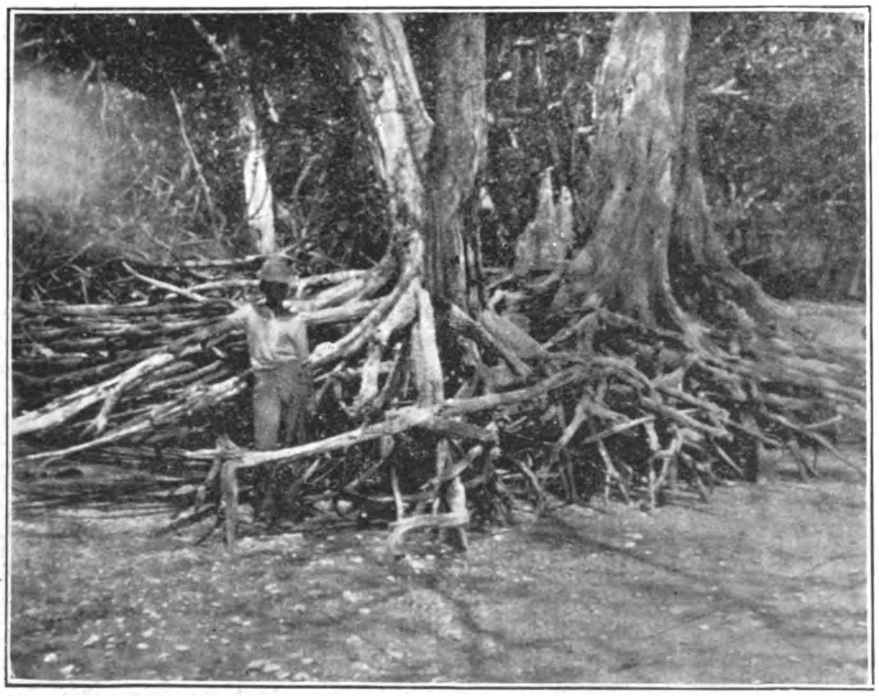
Perhaps no lumber is coming to the front and being appreciated more by the export interest than is the redwood of the California forests. Lately foreign buyers have been inquiring into this lumber—have been making investigations as to its merits, in their search for a lumber that would give better service than that which has been more extendedly exported hitherto.



TRANSPORTING LOGS IN THE PAGSABANGAN RIVER, TAYABAS, BY MEANS OF CARABAOS.

It is not too optimistic to say that redwood is going to fill a far more important place in the Oriental markets than it has so far—that it will be very largely used in railroad work, for ties, etc., that buildings, roofings, pavings, will be very largely involved in its use. Redwood, in fact, is a timber of peculiar qualities, that deserve calling attention to. In the series of technical articles published in the American-Asiatic hitherto, salmon, flour, canned fruits, have had their share of attention. It is now proper to look into the redwood lumber market, and show technical features which are of interest to the practical man, and with this purpose a series of articles will be published until the subject has been fully treated.

The redwood forests of California are famous the world over. Humboldt county and its tremendous trees are sights for tourists from the world over, and they enjoy the distinction of being the largest coniferous trees of the United States if not of the world. A single tree of California redwood furnished the material for one of the largest churches in a town of 700 people—the church stands today complete as to all its frame and covering, outside finishing and inside finishing (instead of plaster) roofing of shingles, all out of a single tree, which in addition supplied 60,000 extra shingles.



ROOT SYSTEM OF MATURE AGOHO (*Casuarina equisetifolia* FORST.) THE ROOTS HAVE BEEN UNCOVERED BY THE ACTION OF THE SEA, AND ALTHOUGH THEY HAVE BEEN EXPOSED FOR SEVERAL YEARS, THE TREES ARE THRIFTY AND BEARING FRUIT.

Redwood is used for furniture, porch columns, tanks, moldings, shingles, flooring, stair work, blinds, paving blocks, veneering, sash, car siding, car roofing, wainscoting, doors, and railroad ties.

Redwood takes a perfect finish; it takes paint perfectly, as few woods do. It is especially a wood for tank building, it neither swelling nor shrinking, and its resistance to decay is notorious when exposed to the weather or in other conditions. It is universally used for railroad tanks in this country, it being, also, especially adapted for this purpose on account of its length of fibre. Related to this use also is the use of redwood for stave pipe. Hundreds of miles of redwood pipe are laid and in use in California giving perfect service as a water carrier of all sorts. Redwood pipe carries water to the domestic consumer and it carries it for miles across mountain and dale for the development of water power, or for mining. For paving blocks it resists the decay of moisture, and it resists the decay caused by insects—a very important item. Similarly for railroad ties.

To the Orient, at present, with its great promise of railroad building and its great railroad building now going on, this question of the timber to be used for its railroad work is important. It is a question of the highest commercial economy—railroads are big institutions that may save or waste at many a point and every day in the year. The economy to railroads in the use of redwood may be in the use of it as ties or in the use of it for buildings—or, for both. The tie question is one that has been thrashed out completely in the United States. The redwood tie is the popular tie with the railroad. The redwood tie (or sleeper as it is sometimes called) has an average life in service of twelve years; oak has only a life of six years. Ants, and other insects will not attack redwood, and it is impervious to the effect of moisture, or rather, putting it correctly, the combination of air and moisture. Immense numbers of redwood ties have been shipped to Peru, Chile and India—and orders come again specified "redwood and no other substitute."

Another part of this general introduction to redwood should not be omitted—it is its beauty. For a finishing lumber it is exquisite.
—*American Asiatic.*

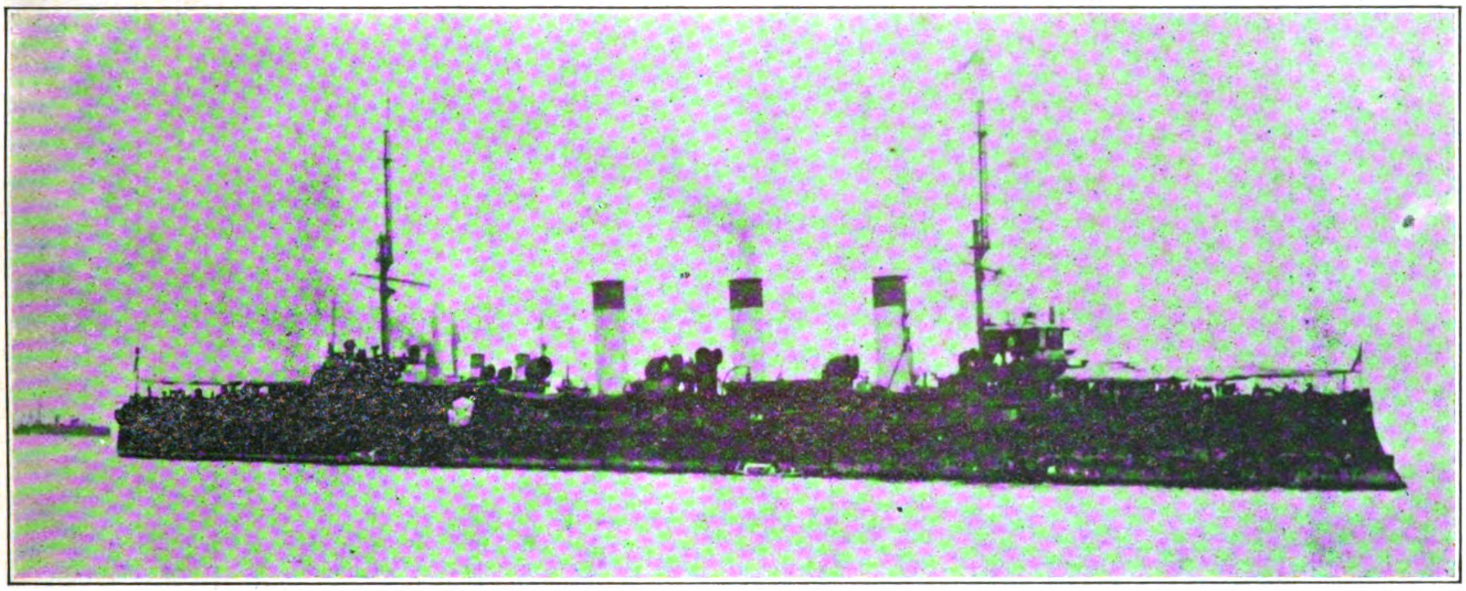
BATTERED RUSSIAN CRUISERS IN MANILA BAY

The Russian cruisers *Oleg*, *Aurora* and *Zemtchug*, bearing many honorable scars as the result of the attacks of the Japanese warships in the recent naval battle, are being repaired by the marine engineering firm of Messrs. Manuel Earnshaw & Co. of Manila. The contract to completely repair these ships was awarded to this firm immediately upon the receipt of orders from St. Petersburg by Admiral Enquist to intern his vessels until the close of the war.

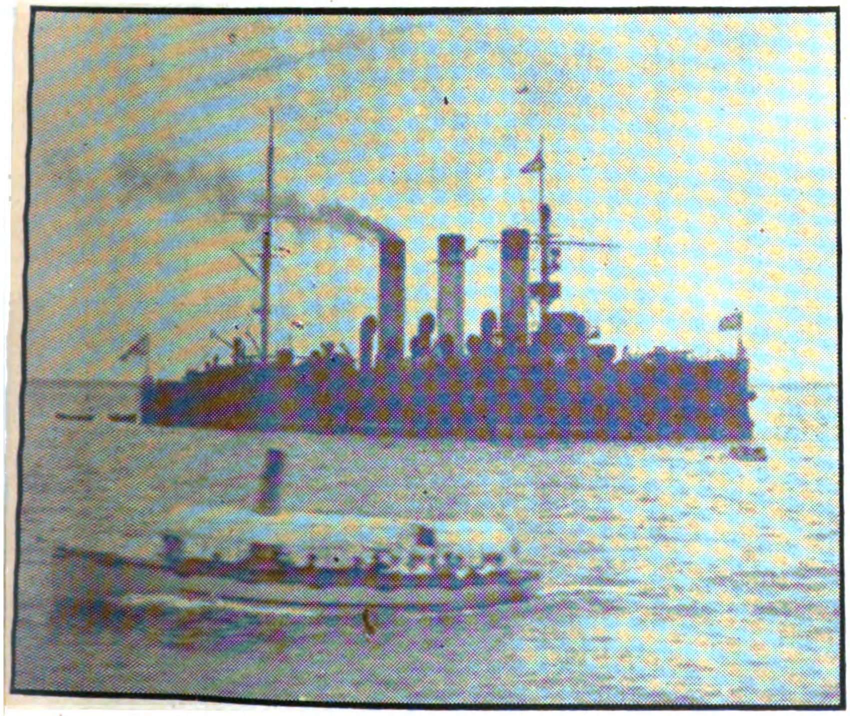
The contract requires the repairs on hulls, interior and upper works to be completed in sixty-three days for the *Oleg*, forty-five days for the *Aurora* and twenty-eight days for the *Zemtchug*. The exact cost of the work can not be accurately estimated, as the contract prices are on the unit basis for labor and materials. About $60,000 gold will probably be required to pay the contractors, who are under bond to forfeit $250 gold per day for delay beyond the time limit.

Messrs. Earnshaw & Co. secured the contract in the face of keen competition in bidding. A board of six Russian naval engineer officers was detailed by the Admiral. These officers considered the bids, inspected the plans of the several bidders, and awarded the contract to Messrs. Manuel Earnshaw & Co. because of their superior facilities.

All of the warships were riddled with shot and shell during the battle. The *Zemtchug* was the least damaged of the trio. The Oleg's hull was pierced by fourteen 6-inch shells and her superstructure riddled by smaller shots. Her hospital was swept away. The *Zemtchug* has a few holes in her hull and funnels, while the *Aurora* sustained a great hole in her hull near the water line. The wonder of it is that she did not founder before she reached this port.



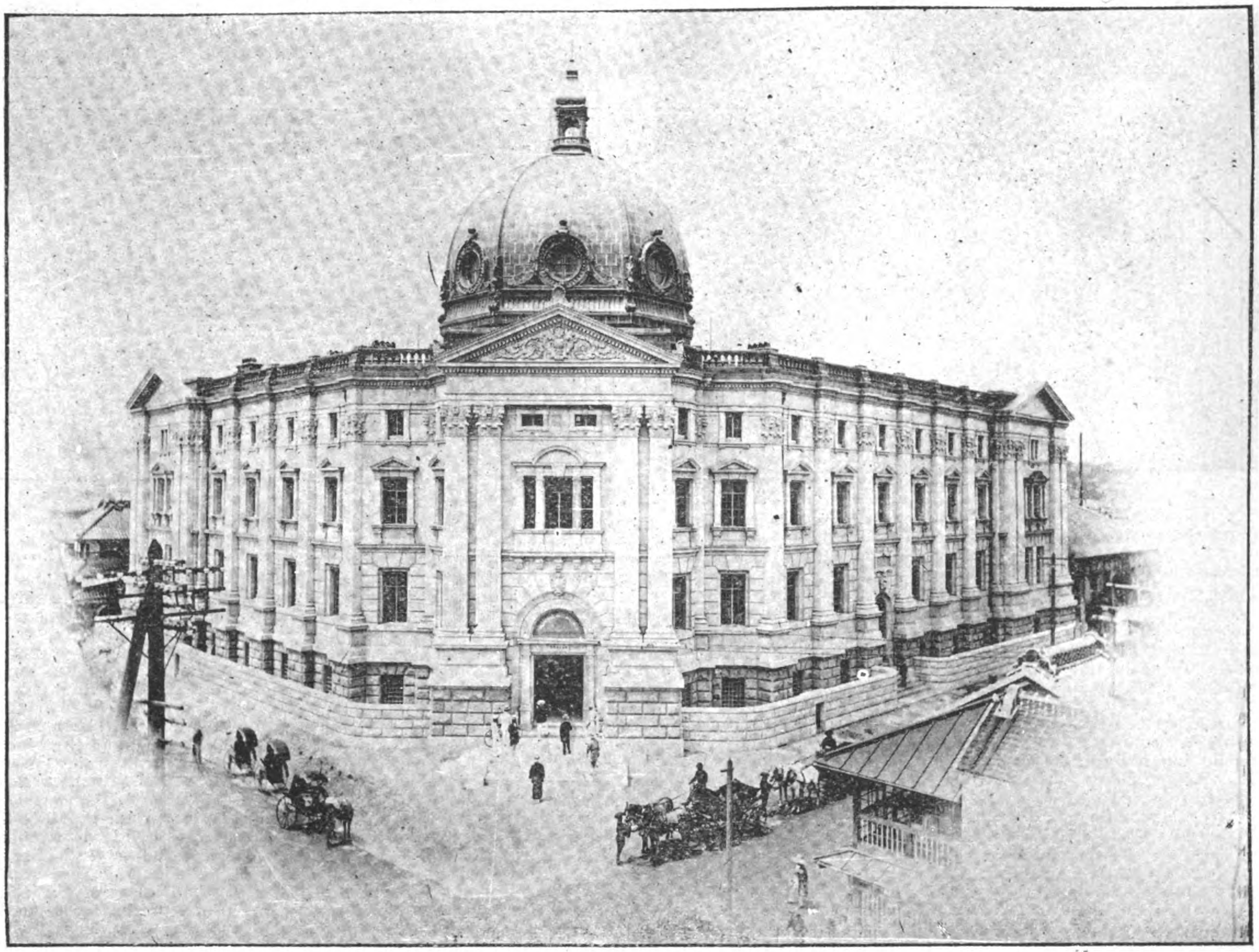
RUSSIAN CRUISER "OLEG"



RUSSIAN CRUISER "AURORA," ADMIRAL ENQUIST'S FLAGSHIP

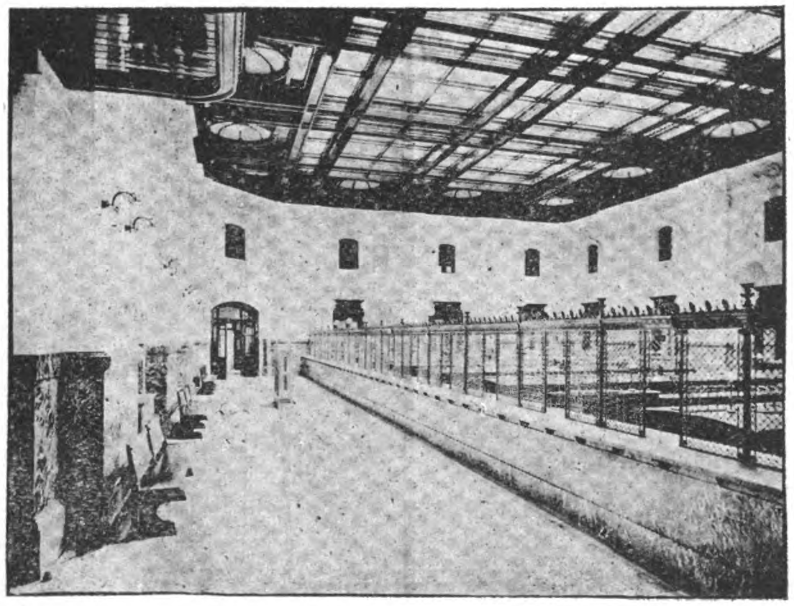
EFFECTS OF A JAPANESE SHELL ON "OLEG'S" "ARMOR-PLATE."

NEW BUILDING FOR THE YOKOHAMA SPECIE BANK.

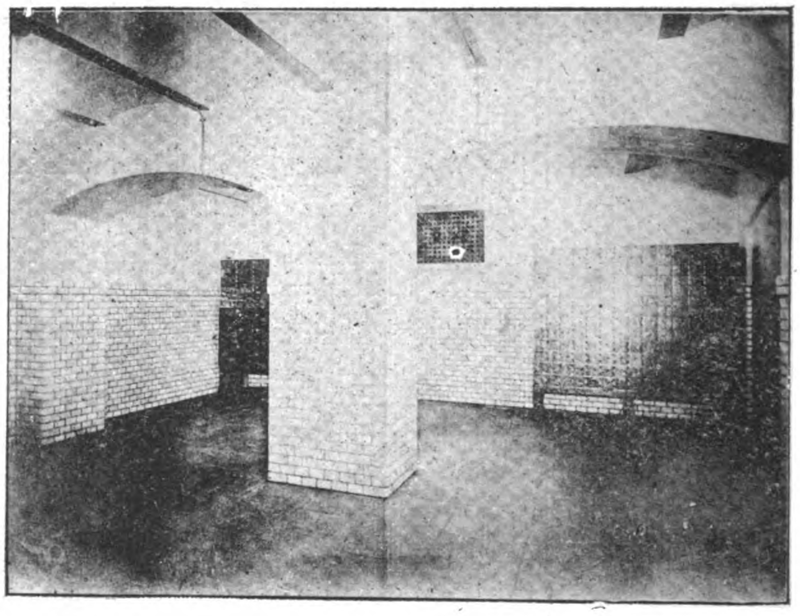


NEW BUILDING FOR THE YOKOHAMA SPECIE BANK, YOKOHAMA—FRONT ELEVATION.

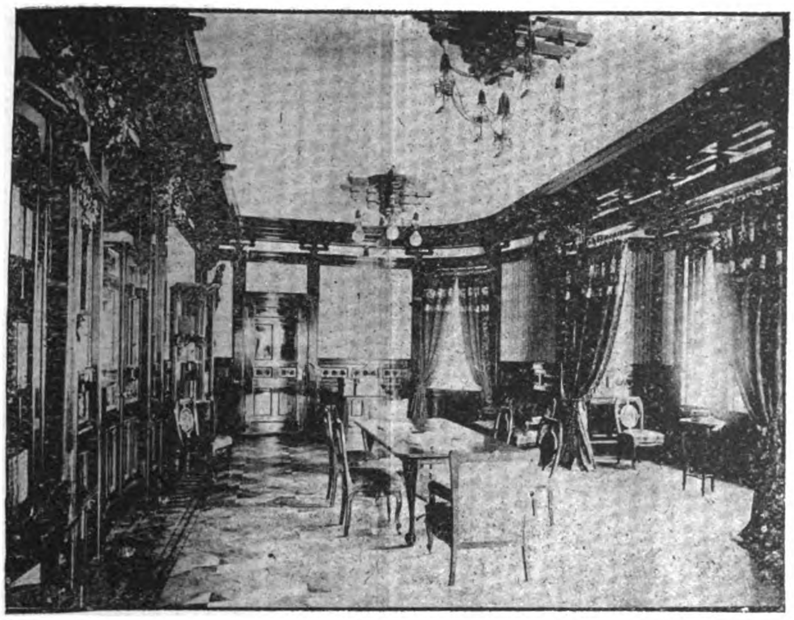
The new Yokohama Specie Bank building, occupying a magnificent site at 83 Gochome, Minami Naka-dori, Yokohama, is the result of an attempt to adapt the best features of modern banking institutions of the most advanced type to the requirements of the customs and conditions peculiar to Japan; and it should be mentioned that in drawing up its design, considerations of architectural beauty in its external appearance and its internal arrangements had to be sacrificed for the sake of utility and solidity which constituted the principal object to be attained. The work of construction was undertaken under the direct control of the bank, the workmen



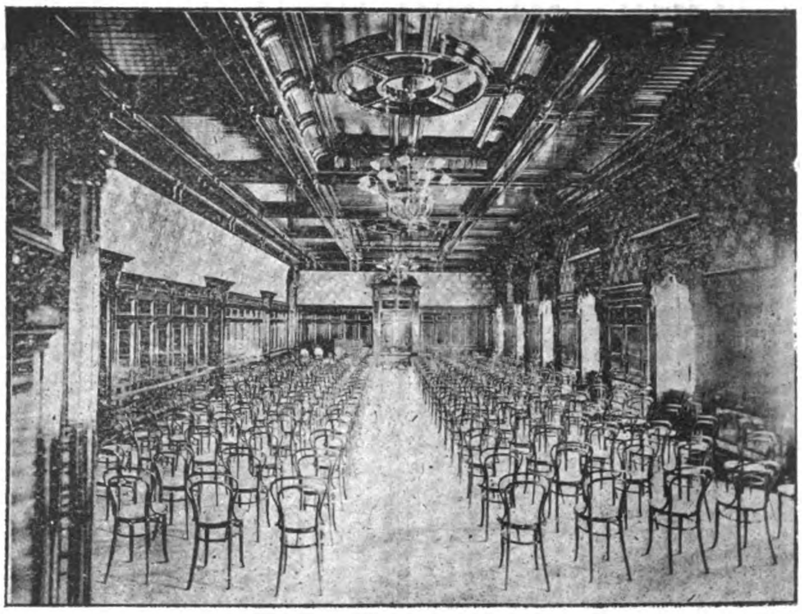
THE MAIN BANKING ROOM.



INTERIOR VIEW OF THE SAFE DEPOSIT VAULT.



READING ROOM.



MEETING ROOM.

engaged being for the most part in its regular employ.

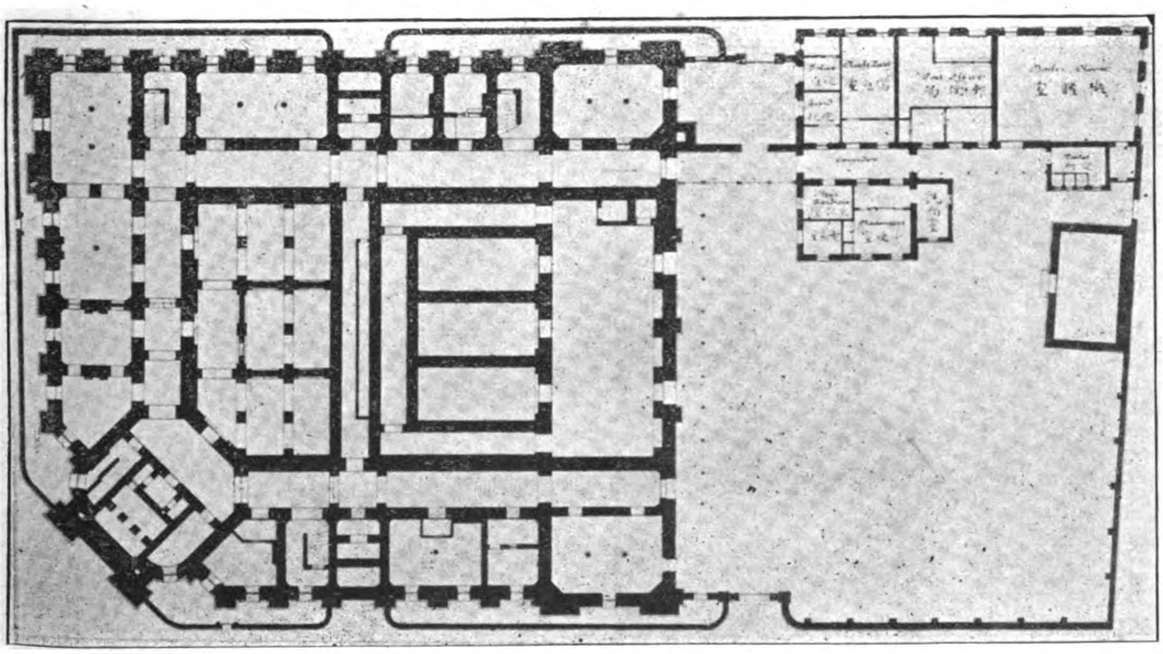
Work on the foundation was begun March 25th, 1899, the whole work being finished in July, 1904. Dr. Yorinaka Tsumaki had charge of all the affairs connected with the construction of the building. Mr. Riyemon Kimura acted in the capacity of Building Commissioner from March, 1899, till the whole work was brought to completion.

The principal entrance to the building at the corner between Minami Naka-dori and Bashamichi-dori is for the use of the public. The sides facing Minami Naka-dori and Benten-dori are provided each with one entrance, while there are two others at the back. These are for the use of the staff of the Bank and others. The area of the Bank compound is 1,229 *tsubo* 6 *go* 9 *seki* (43,758 sqr. ft.), and the ground area of the building 652 *tsubo* 2 *go* (23,217 sqr. ft.). Its height above street level is 54 *shaku* 5 *sun*. The apex of the dome over the front of the building is 119 *shaku* above the level of the street (1 *shaku* is equal to 0.994 foot). There are four floors, viz, the basement, the ground floor, the first floor, and the second floor.

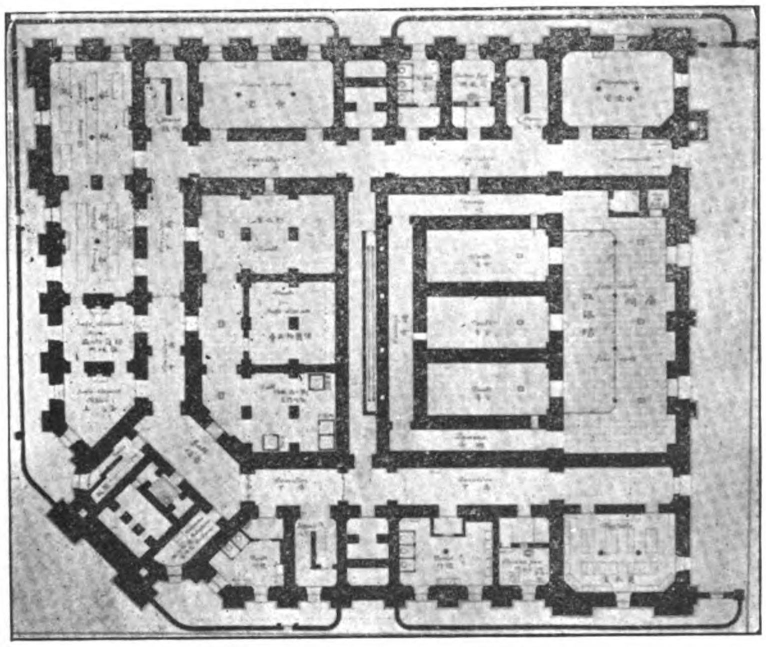
GENERAL VIEW OF CONSTRUCTION.—The foundation of the building is solid concrete and the basement is provided with an arched brick floor, as is also the ground floor. The floors of the first and second stories were constructed by spanning the space between the steel I beams with segmental corrugated iron sheets, filling the inside with concrete and covering the top face with either wood or stone. The building being intended to be proof against earthquake and fire, the front wall at the thickest parts in the basement is 4 *shaku* 2 *sun*, while even at the thickest parts in the attic it is not less than 1 *shaku* 5 *sun*. The walls are relieved of the strain and weight imposed upon them by the use of steel frames consisting of steel rods with four tiers of flat bars 6" or 5"x3/8" strengthened by the use of anchors in the essential points of construction. The whole is so tightly constructed that it may be likened to a solidly constructed birdcage. In plastering the wall the ordinary Japanese method of lime plastering was not adopted. This was modified with certain features of the method used in the United States and Europe. The stones employed in the wall are joined together with strong clamps and kept to the brick backing by means of anchors. The cornices are held tight by means of the steel rods in the wall which pass through the latter and are screwed tight on top. To further insure safety they are also joined to the steel beams of the ceiling of the second floor, the construction of which is the same as that of its floor. It is fire-proof. The material for the roof trusses is steel and the outside is covered with copper plate. The mosaic floor in the hall of the main entrance is made of various descriptions of stone materials from France.

MATERIALS USED IN CONSTRUCTION.—The principal varieties of timber employed in the construction of the building are teak, pine, oak, etc. The granite used in the massive projecting columns, the ornamental parts of the principal entrance, and the windows in the facade, is from quarries in the Province of Hitachi. The stone facing of the walls of the first and second floors is of the material from the Shirochoba quarry in the Province of Sagami, while the granite used in the cornices and stairs and other places is from the Kitani quarry in the Province of Bitchu. The large panels of dadoes in both sides of the principal entrance are made of the serpentine from Chichibu in Musashu, while above the dadoes the walls are trimmed with Fukushima marble. The dadoes in both sides of the side entrances are made of Rikuzen marble.

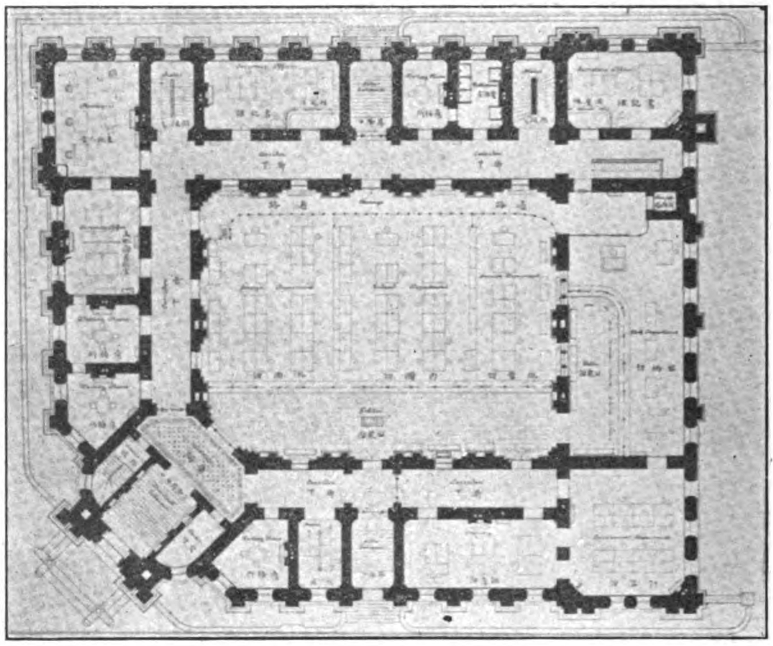
SPECIAL ARRANGEMENTS.—The dadoes around the First Banking Room and under the counters are made of the serpentine from Chichibu, while the counters are of Shinshu granite. The screens on the counter have been



GENERAL PLAN OF THE BUILDING.



BASEMENT PLAN.



GROUND PLAN.

especially made by artistic workmen. The room is lighted by double skylights, the one in the roof being of a wired glass and that in the ceiling of a stained glass. In order to prevent the penetration of sun beams, an opaque glass is used both in the roof and the ceiling. An arrangement is provided by which water is sprinkled during summer from the ridge of the glass roof over the surface of the glass. Ventilation is effected during summer by means of a number of outlets in the roof which are provided with laps that may be opened or closed at will. The movement of the air is facilitated by electric fans which are in perpetual motion. This room is divided into three sections for the accommodation of the respective divisions of the business department of the Bank. Each section is provided with a number of counter windows for the convenience of the public. In order to facilitate the transaction of business, a pneumatic message service is provided between the banking room and the accountant department, so as to save the time and trouble involved in passing to and from the two rooms. The floor for the public in the banking room is paved with marble from Akasaka in Mino, which is of a quality best fitted to prevent the echo of the tramping of foot.

The construction of the Second Banking Room does not differ from that of the First Banking Room; only, that this is devoted to the handling of cash, it is separated from the other room by iron railing, and on one corner is provided a hydraulic coin elevator to facilitate communication with the vault in the basement.

VAULT.—The thickness of the vault wall is 4 *shaku* 2 *sun* 6 *bu*. The inside of the vault is divided into three chambers devoted to different purposes. The door of the vault is so constructed that it can not be opened without the fact being automatically announced by an electric apparatus to the superintendent in the banking room above. The forevault is surrounded by a wrought-iron railing and is used for the inspection of species, which are examined here before they are put in the vault. The vault contains several iron safes made in the United States and equipped with changeable locks.

SAFE DEPOSIT VAULT.—This vault is specially separated from the others. It contains 200 American-made safe deposit boxes with changeable locks. The ventilation of this compartment is effected by means of electric fans. In the winter the air is heated.

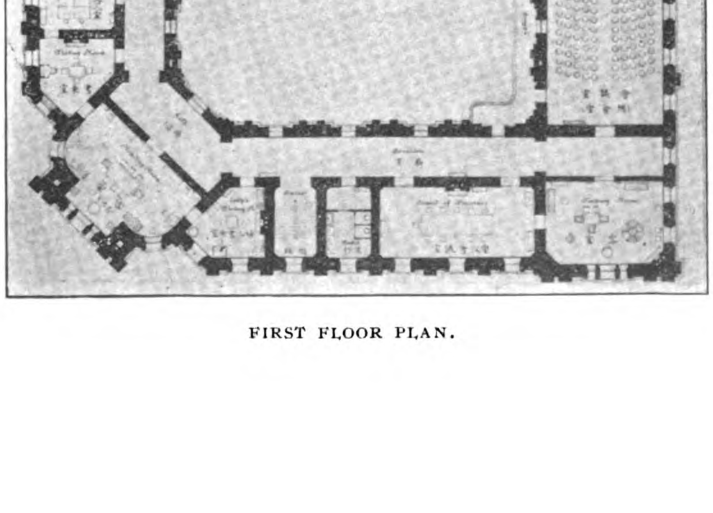
Other rooms in the building are as follows:—Ladies' Room, Letter Writing Room, Meeting Room, Wardrobe Room containing washstands, and Lavatories.

HEATING, ELECTRIC WIRING, ETC.—The apparatus used for heating the different rooms is a patent manufacture by Messrs. Körting & Co., of Germany, with latest improvements. It is provided with a separate regulator of temperature for each room.

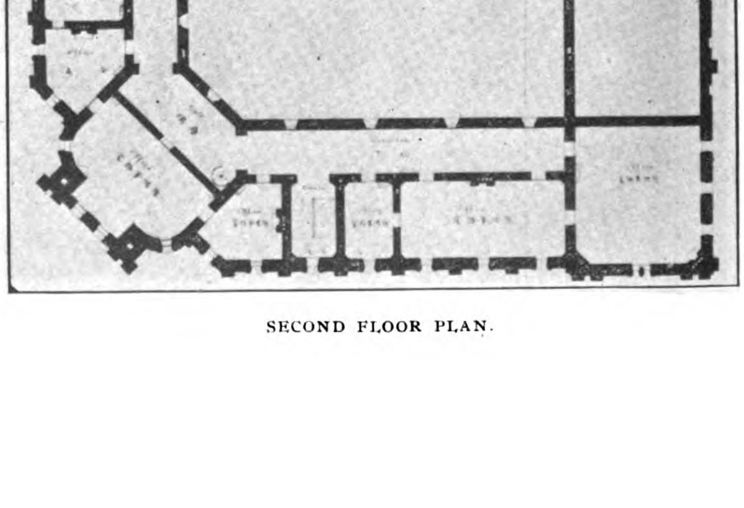
The electric wires are passed through insulated conduits, so as to prevent the escape of electricity through damage done by rats, etc. They are embedded in the wall and floor, with junction boxes at frequent intervals for convenience of repairs.

IMPORTED MATERIALS.—The following shows the imported materials used in the construction of the building and their makers:—Hardware, Yale and Towne Manufacturing Company, New York, U. S. A.; sheet and plate glasses, Messrs. Pilkington Brothers, London; steel beams of girders, Carnegie Steel Company, Pittsburg, Pa., U. S. A.; steel window casements, Messrs. Henry Hope & Sons, Birmingham, Eng.; revolving iron shutters and self-coiling steel shutters, Clerk, Bunnett & Co., London; coin elevator, Otis Elevator Company, New York, U. S. A.

(Continued on page 15.)



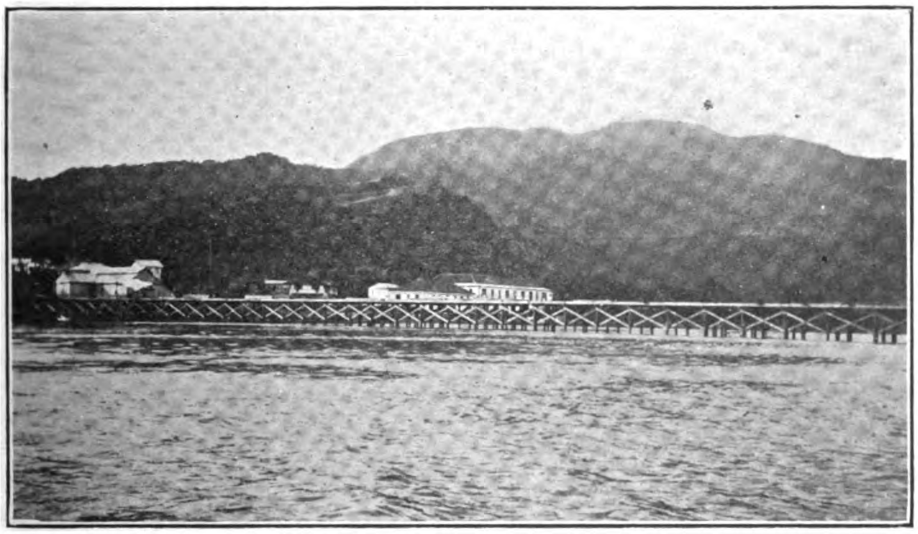
FIRST FLOOR PLAN.



SECOND FLOOR PLAN.

ISUAN BOTTLING FACTORY AT LOS BANOS.

Nearly everyone knows—that is, everyone in the Philippines—that Isuan is a mineral water from Los Baños. Few people, however, realize the amount of work and care involved in the process of so bottling this water as to place it before the public in its pristine purity.



LOS BANOS, SHOWING NEW PIER, WITH MT. MAQUILING IN BACKGROUND.

The name Isuan is one handed down in Filipino folklore and means Health-Spirit or Angel of Health. In the region adjacent to Laguna de Bay, Province of La Laguna, the inhabitants in olden times spoke of Los Baños as the home of the Health Spirit because of the wonderful health-giving properties of the mineral waters from the natural springs there. Thus was suggested the name of the water as bottled by the Los Baños Improvement Company, and thus Isuan has become a household word throughout the Islands.

In their works at Los Baños the Isuan people have introduced a perfect system for carbonating and conserving this splendid product of nature. A commodious iron building has been erected, one wing constituting the boiler and engine house. The main floor is devoted to the carbonating and bottling of the water while another wing is taken up by bottle-washing tanks and water tower. This tower stands over the spring from which the mineral water flows almost boiling hot. This spring is enclosed by a solid cement wall 1¼ ft. thick, sunk to a depth of 15 ft., thus obviating all possibility of seepage. The top is securely covered, permitting only of the entrance of pipes through which the water is projected to tanks at top of tower by means of a steam pump which operates steadily all the time, being gauged to supply the quantity of water utilized. The water passes first into one large tank set above the others. This supplies the bottle-washing tanks below with hot water and also supplies water to the cooling tanks—eight in number—which are so arranged that the water passes through the entire series. The connections being at the bottom of each tank, keeps the water in continuous flow during the cooling process. All of these tanks are carefully closed with the exception of a vent, or chimney, in the top, which is stuffed with raw cotton. This filters all air that enters the tanks or comes in contact with the water.

From these tanks the water is conducted through a 160-ft. coil of block-tin pipe which is kept packed in ice and reduces the water to a temperature of 50 deg. F. as it enters the carbonator to be charged with carbonic acid gas. The same extreme care is observed in cleansing the bottles and preparing them for filling as marks the treatment of the water. The bottles are first placed in large tanks which are filled with the natural spring water. They are left there to soak for from eight to twelve hours. These tanks are filled with steam pipes by means of which the contents are kept at boiling temperature for a period during the soaking process. When removed from these tanks the bottles are carefully washed by hand and then placed on spindles and rinsed by a spray fed from the main tank in the tower. Thus the insides of the bottles are finally rinsed by water that has not been touched by men's hands nor exposed to any contaminating influence whatever.

But precautions do not cease here. The crown cork caps with which bottles are stoppered, are boiled before using, and the men who handle them are required to wash their hands in a disinfectant before beginning work at the bottling tables. It is by such measures as these that users of Isuan are safeguarded and assured when they drink this water that it is in its natural purity and healthful state. It goes in reality from the spring to the bottle, coming in contact on the journey with only filtered air and the filtered gas with which it is charged.

WHERE NATURAL ISUAN IS CARBONATED AND BOTTLED.

SORTING THE BOTTLES FOR THE MARKET.

NEW BUILDING FOR THE YOKOHAMA SPECIE BANK

(Concluded from page 14.)

CONSTRUCTION SUPERINTENDENTS.—Those who assisted in carrying out the work to a successful completion under the direction of Dr. Tsumaki were the following:—Superintendents of work, Architect Oto Endo, Kogakushi, and Architect Sakuzo Yarita; account and general business, Mr. Shuichi Iida; manufacture of furniture, Mr. Yonekichi Shimizu; overseers, Messrs. Juji Hanasaki, Torajiro Sasuga, Umetaro Kuwabata, Kinjiro Sajiki, Heijiro Fujii, and Rikichi Yasukochi; draughtsmen, Messrs. Tomosaburo Horiuchi of Kogakushi, Kozo Yukawa, Yoshijiro Sasaki, Etsuzo Harada and Kiichiro Ishii; electric engineer, Mr. Juki Kobori, Kogakushi, engineer of the Yokohama Kyodo Electric Light Company; electric work assistant, Mr. Shiro Esawa; modeller, Shunyo Takaki.

MUNICIPAL IMPROVEMENTS IN SHANGHAI SETTLEMENT.

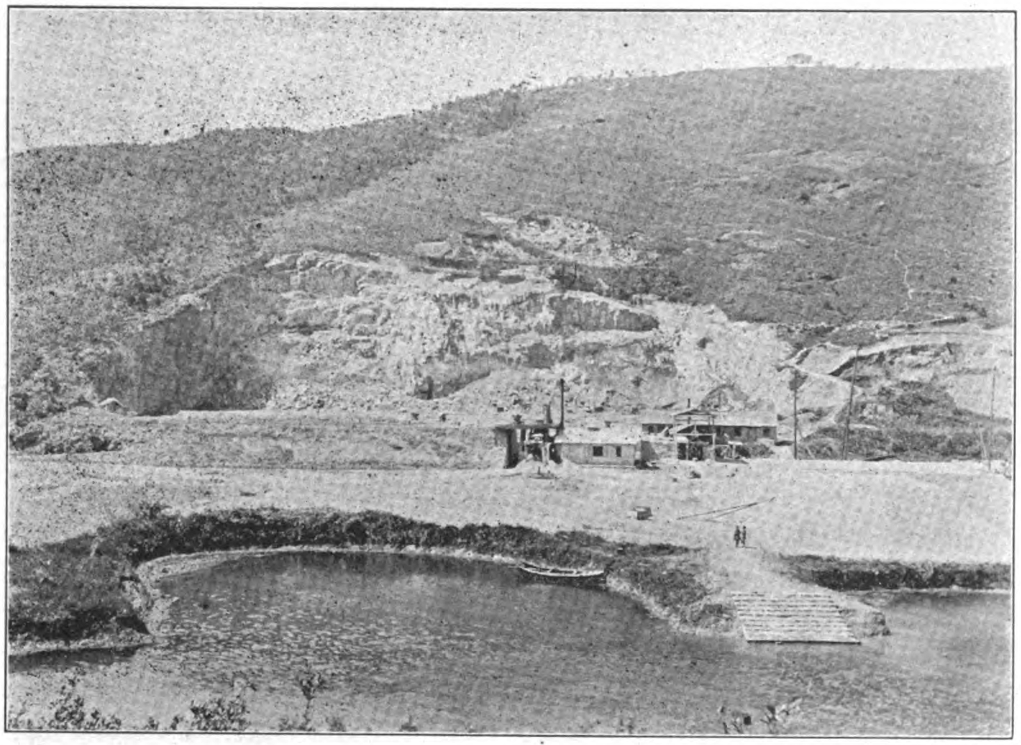
(Continued from page 5.)

wards are connected by a covered corridor open at the sides, with concrete floor and tile roof. The whole of the buildings are provided with electric light, and electric bells and telephones connect the various departments as required. The walls are built of red brick with Ningpo green stone sills, copings, etc., and the roofs are of Marseilles red tiles. The total cost of the buildings, exclusive of land, has been 175,000 Taels.

BUBBLING WELL POLICE STATION.—These buildings comprise:—Main building for foreign police, Indians' quarters, native quarters, stabling, cells. Main building: ground floor contains charge room 18' x 20', detective office, property-room, bed-rooms providing for 4 constables, bath-rooms, mess-room, canteen, and drying-rooms, kitchen and pantry. The first floor contains quarters for inspector, consisting of sitting-room, 2 bed-rooms, bath and store room, kitchen, pantry, and servants' quarters. An extra room is also provided for 2 constables on this floor. Indians' quarters: space is allotted for 20 Indian police in 2 rooms 36' x 20', with separate room for Indian sergeant, also cook-house, drying-room, and bath-room. Native police quarters are detached, together with cook-house and drying-room. Stabling is provided for 8 horses, with mafoos' room over, also harness-room, fodder, store and cook-house; 3 lock-up cells have been built, each 18' x 10', providing for 5 convicts in each. The floors are of concrete overlaid with boards, ceilings are of concrete also and the front is enclosed with strong iron grill framework which is immediately overlooked by the charge-room window. The main buildings are of red brick and green Ningpo dressings and roofs are of corrugated iron. The site has been enclosed with a simple bamboo fence of somewhat new design with Oregon pine posts at intervals. The double entrance gates are of wrought-iron, hanging from brick piers with stone copings. The total cost of buildings, entrance gates, and fencing, exclusive of roads and raising the site, has been 28,690 Taels.

GAOL, WOMEN'S BLOCK.—A new block of cells has been erected at the gaol for the detention of female prisoners. The new building stands at the N. W. corner of the gaol and enclosure and consists of 36 cells, each 9'x5'x8' 6" high, arranged on 3 floors, 12 cells to each with gangway running the whole length of building. The general arrangement and construction of the cells is similar to the large wards for male prisoners, built in 1902, except that the cells are not in this instance built back to back, but are arranged in one continuous row, thereby getting a southern aspect to each cell. There is a large work-room occupying the whole of the upper floor of the building. The ground floor also contains receiving-room, bath-room, and clothing store. The cost of the building has been 10,800 Taels.

ELECTRICITY WORKS.—A brick wall 25' 0" high, dividing the engine and boiler houses, was built early in the year at a cost of Tls. 2,000. Concrete foundations for 2 condenser engines and one boiler and also new cable trenches were constructed by the council's own workmen. Two transformer houses 10' x 10' have been built for the use of the Electricity Department, one on site of Bubbling Well police station and the other on the municipal concrete yard in Range Road. These have been solidly built of brick-work with stone dressings to gables and roofed with corrugated iron. Cost Tls. 400 each.

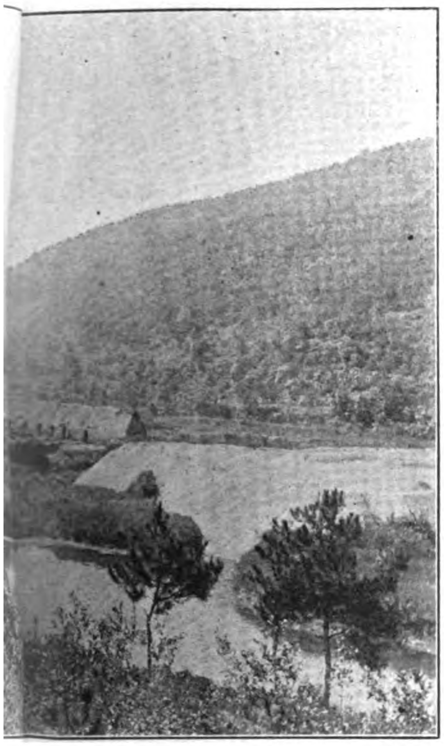


SINZA POLICE STATION.—Good progress has been made with these buildings, and it is hoped they will be ready for occupation by the 1st of April.

BUNDINGS.—SOOCHOW CREEK.—The whole of these concrete bundings would have been completed during the year had it not been that the Council, on the ground of expense, decided to postpone the work. The section from Winchester Road to North Chekiang Road is practically complete, and 300 feet out of the total of 575 feet has been completed between North Chekiang and North Fokien Roads. Between Chapoo Road and the Garden Bridge a length of 275 feet has been completed out of a total of 560 feet. Between Chapoo Road and North Szechuen Road a length of 150 feet, out of a total of 400 feet, has been completed. All the wooden bundings on the North side of the creek between Honan Road and the Stone Bridge have been repaired.

HONGKEW CREEK.—A hardwood bunding has been constructed on the Dixwell Road side be-

FOUR VIEWS OF THE M



tween Yuhang and Hanbury Roads. The piles are from 18 to 22 feet in length.

DEFENCE CREEK.—A concrete bunding, about 150 feet in length, has been constructed on the Burkill Road side, so as to obtain a full width of 40 feet for the road. This bunding is on the south side of the bridge.

YANGKINGPANG.—About 2,500 feet of bunding has been repaired.

YANGTSZEPOO CREEK.—The wooden bunding on the west side of the creek has been repaired.

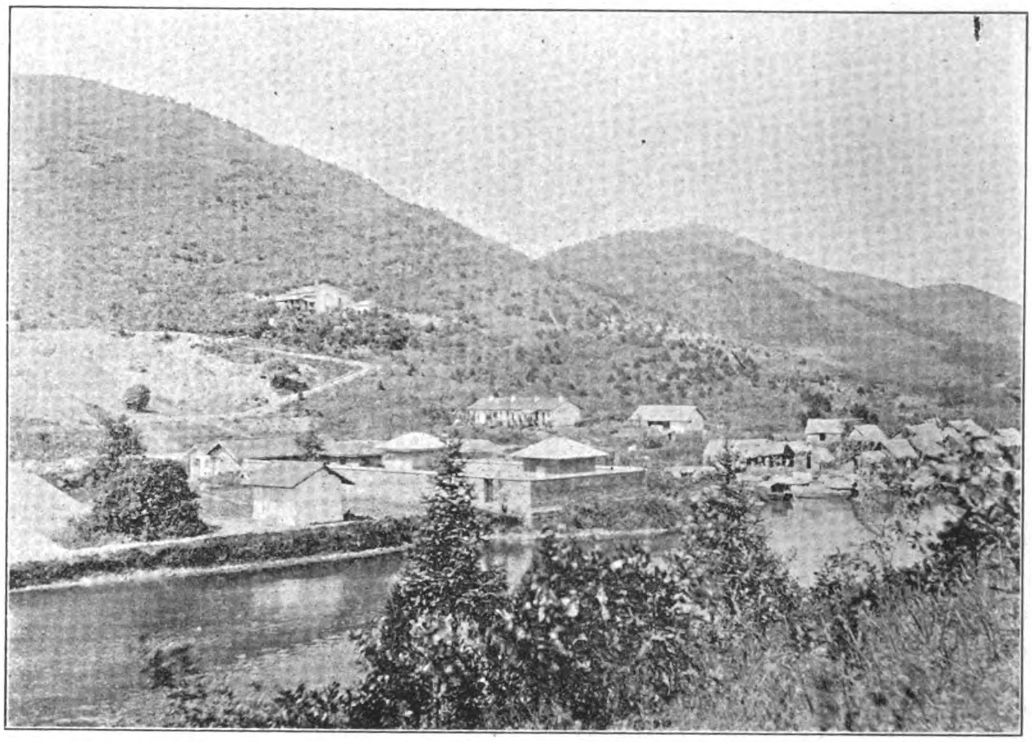
CREEKS AND RIVER.—A tidal ditch has been excavated through Bubbling Well cemetery, parallel to and close to Siccawei Road, connecting the dead ends of ditches on Bubbling Well Road and Great Western Road. Two new 3' 0" diameter culverts have been constructed for carrying this ditch under Great Western Road and under the entrance to the cemetery off Siccawei Road, and three old defective brick culverts in this locality have been reconstructed at lower levels.

SOOCHOW CREEK has been dredged in front of the various garbage depôts and 2,236 tons of mud removed.

HONGKEW CREEK in front of the Seward Road garbage depôt has been dredged and 960 tons of mud removed.

LANDING ACCOMMODATION. — WHANGPOO RIVER.—Two new pontoons, 60' x 20', with the necessary jetties and connecting bridges, have been erected on the Bund, one on each side of Foochow Road.

The Hankow Road pontoon with its jetty and bridge has been moved a little further north to meet the convenience of the Customs authorities, who agreed to defray one half of the cost of removal.



SOOCHOW CREEK.—6 new landing stages have been erected in connection with the new concrete bundings.

PINGCHIAO QUARRY. — QUARRYING.—3,749 tons of good rock have been quarried from the small hill and 38,386 tons of good stone and 5,170 tons of decomposed sand from the large hill. The amount of stripping to be done has been unusually heavy, but as labor has been plentiful the work has been kept well in hand. The level of the quarry floor has again been raised about two feet, so that it is now almost level with the platform of the "Gates" crusher.

STONEBREAKERS.--The No. 1 (or Baxter) has worked 222½ days and 44½ nights and broken 13,513 tons of stone.

The No. 2 (or "Gates") has worked 277½ days and 52 nights and broken 19,433 tons of stone.

BORING.—20,072½ feet of holes have been bored and blasted.

DYNAMITE.—3,390 lbs. of dynamite have been used, giving an average blast of 11.76 tons to 1 lb. used.

MATERIALS DISPATCHED.—36,536½ tons of materials have been dispatched and used at the quarry and 5,395½ tons are in stock ready for dispatch.

LABOR.—The average number of laborers, exclusive of artisans, employed each day, has been 103, and work has been carried on for 329 days. In addition to this 32 coolies worked on 96 nights.

CREEKS.—A fair depth of water has generally been maintained.

PAVEMENTS—The total length of pavements laid in 1904 was 5 miles 648 yards, as against 3 miles 538 yards in 1903. There are now 65 miles and 1,562 yards of footway in the Settlement.

PORTLAND CEMENT CONCRETEWARE.—During the year the total quantity of concreteware manufactured by the Department amounted to 55,957 pieces, as against 68,461 pieces made in 1903. Of these, 14,609 were made by machinery.

PERMITS.—6,599 permits were issued during 1904, as against 5,672 in 1903.

NEW BUILDINGS.—During the past year permits have been issued for the erection of 4,931 new houses, as against 4,330 in 1903.

The 4,931 new buildings erected during the year may be classified as follows:—Native buildings, 4,711; foreign buildings, 150; godowns, 31; mills, manufactories, etc., 9; additions to buildings 30, Total, 4,931. Of the 627 sets of plans submitted during the year, 412 were approved and 215 disapproved.

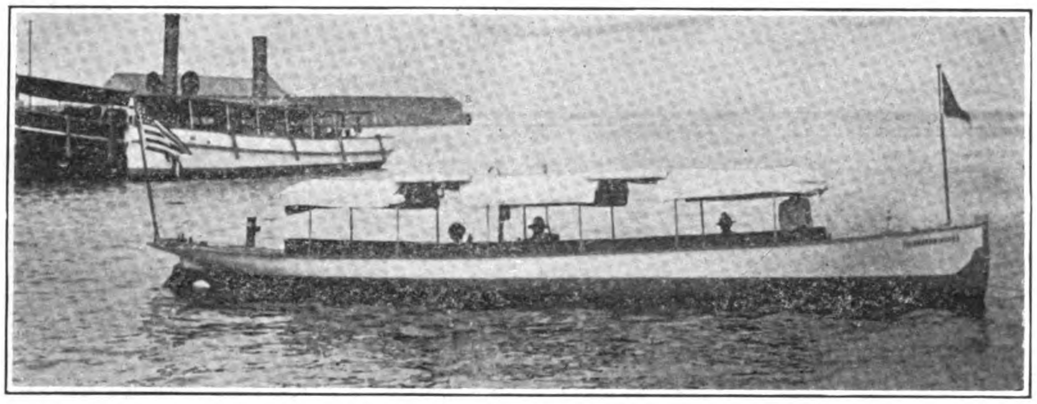
"I am glad to be able to report," says Mr. Mayne, "a distinct improvement in the quality of materials used in the construction of native buildings. There is also an improvement in the class of property being erected, small one-story buildings being replaced by better class two-story houses."

QUARRY AT PINGCHAO.

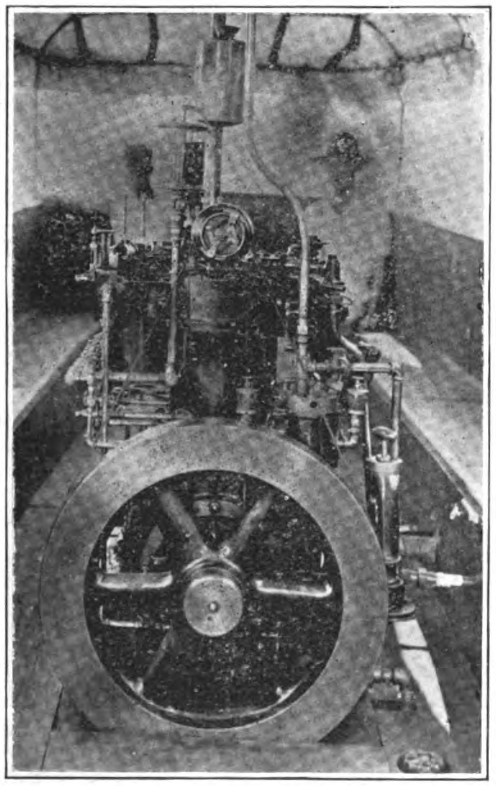
THE LAUNCH "FAIRBANKS-MORSE"

The *Fairbanks-Morse* is the name which Messrs. Castle Bros.-Wolf & Sons, of Manila, have given to their trim little petroleum motor launch, the first craft of its kind built in the Philippines. The launch was recently given a trial trip on the Pasig River, Mr. Murray Hendry being in charge, and she showed thoroughly what she can do in the way of economical steaming. She has accommodations for thirty passengers and she is able, with her 10 h. p. engines, to make 8 knots an hour without straining, at a cost of about 15 cents gold an hour, or 30 cents Conant. The craft takes her name from Fairbanks, Morse & Co., of America, builder of the type of marine engines with which she is equipped for which Messrs. Castle Bros.-Wolf & Sons are agents. One novel feature of these engines is that they can be run with either petroleum or gasoline, the method of conversion from one to the other being simple. The length of the launch is 38 ft. with a 7-ft. beam and it draws only 2½ ft. of water and can be used in any of the small rivers in the provinces. The total cost of the launch was $2,500 gold. It is built of Philippine hardwoods, all the interior fittings, seats, etc., being of teak. She was built at the San Nicolas Iron Works of Manila, under the personal supervision of Mr. "Bob" Scott, and she illustrates well the high class of work of this character that can be done by the shipbuilding firms of Manila.

Messrs. Castle Bros.-Wolf & Sons are now prepared to draw plans for, build, and completely equip such launches, and this launch was built to demonstrate the utility of these petroleum launches in the Philippines where coal is so expensive and gasoline so difficult to obtain at any price many times during the course of a year, even in Manila. Petroleum can be obtained at any small town or pueblo in the Islands. Another advantage of the petroleum launch is that when "lying alongside" there is no unnecessary waste of fuel as is the case with coal, which must always be kept burning. The petroleum on the other hand can be shut off and so conserved at any time at a moment's notice so that there is most appreciable saving.



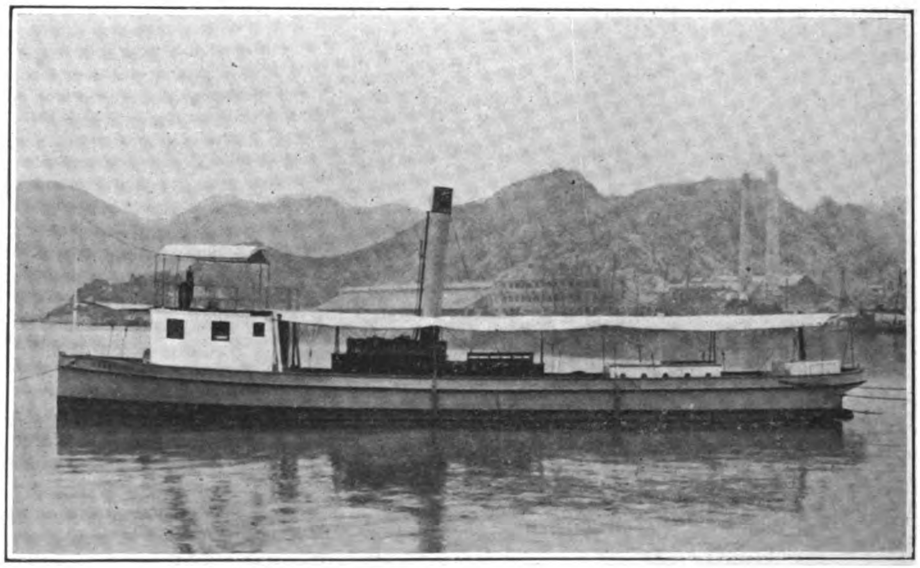
PETROLEUM MOTOR LAUNCH "FAIRBANKS-MORSE."



ENGINE OF THE "FAIRBANKS-MORSE."

STEAM LAUNCH "BRAMTOCO"

The first successful shallow-draught, hollow-stern launch designed and built in Hongkong was recently completed by Messrs. W. S. Bailey & Co. for the British American Tobacco Company. The vessel is named the *Bramtoco*, and is 80 ft. long x 16 ft. beam, equipped with twinscrew engines. The stern is fitted with two tunnels, and she draws only 2 ft. 9 in. of water when loaded. The *Bramtoco* may claim to be the pioneer vessel trading to the Upper Reaches of the West River, with Nanning as headquarters. She is built on the same principle as the Admiralty's well-known river gunboats of the *Sandpiper* class. The difficulty of steering this type of vessel has hitherto necessitated the fitting of three, and even four, rudders, which, it need hardly be said, means complication and extra weight. In the *Bramtoco* Messrs. Bailey & Co. have now surmounted this difficulty by designing a special fin attachment for the after-part of the vessel, and only one rudder is used. This being a decided departure from the usual practice, the vessel was severely tested as to her steering powers; but the builders have every reason to be satisfied with the single rudder. At the trial trip, with rather a rough sea and strong winds, the speed attained was 10½ knots, with a 25-ton load on board.



SHALLOW-DRAUGHT, HOLLOW-STERN LAUNCH "BRAMTOCO."

FINANCIAL NEWS

JAPANESE WAR LOAN – The Equitable Life Assurance Society of the United States has subscribed £400,000 to the new Japanese Loan.

NARITA RAILWAY COMPANY, JAPAN.—This corporation has declared a dividend at the rate of 5 per cent per annum for the last six months.

WM. POWELL, LTD., HONGKONG.—The capital of this Company has been increased from $120,000 to $150,000 by the creation of 3000 new shares of $10 each.

JAPAN COAL BRIQUETTE COMPANY.—At the half-yearly meeting of this Company held recently a dividend of 9 per cent per annum was declared for the past six months.

NEW BANK, HONGKONG.—A branch of the Agencia de Banco Nacional Ultramarino, of Macao, a Portuguese institution, has been opened in Hongkong with Mr. J. J. Leiria in charge.

JAPANESE TOBACCO MONOPOLY.—The Japanese Tobacco Monopoly, according to the *Peking and Tientsin Times*, has been a great success, the net profits for the last fiscal year amounting to -Y-27,000,000.

MARINE AND FIRE INSURANCE, SHANGHAI.—The Ningpo merchants in Shanghai have collected Tls.100,000 as the nucleus of a marine and fire insurance company which they propose to start and which has been sanctioned by the Board of Commerce at Peking.

SANYO RAILWAY COMPANY, LTD.—The report of this corporation for the term ending March 31st shows a divisible balance of-Y-2,271,390. It is proposed to add-Y-91,000 to reserve, pay a dividend at the rate of 10 per cent per annum and a bonus of-Y-42,500, and carry forward the balance,-Y-674,140.

STAR FERRY COMPANY, LTD., HONGKONG.—The net earnings of the boats of this Company during the last year were, after paying all working expenses, $56,692.45 againts as $55,684.42, the previous year, being an increase of $1008.03. The shareholders have declared a dividend for the period of $27,000 or 18 per cent. The *Morning Star* and *Evening Star* have been added to the fleet.

KAWASAKI DOCKYARD COMPANY, KOBE.—It is announced that this Company will call up its unpaid capital to the amount of-Y-800,000 within the first half of the present fiscal year and then increase its capital of-Y-6,000,000 to-Y-10,000,000 in the course of the second half. The Company is now prospering and the ships under construction in the yard numbe between fifteen and twenty.

AMALGAMATION OF INTERESTS, TOKYO.—It is proposed to amalgamate the Tokyo Water Power Electricity Company with the Buso Electricity Company and establish a great water power electric supply undertaking at Tokyo with a view to supplying electric power. At a meeting held in connection with the scheme it was estimated that the capital required to carry out the project will be-Y-6,000,000.

FAR EASTERN ENGINEERING AND CONSTRUCTION NEWS

PERSONAL

Mr. W. W. Rockhill, the new American Minister at Peking, has taken over the high duties of his office.

Mr. J R. Twentyman, who sustained a broken rib and other painful injuries in a runaway accident, recently, is slowly recovering at the General Hospital, Shanghai.

Messrs. Okazaki and Nakata, of the Furukawa (Japan) Mining Firm, are making a tour of China and Korea in order to investigate mining conditions in those countries.

Hon. Hamilton King, American Minister at Bangkok, Siam, accompanied by Mrs King, has left his post and is returning home to the United States on a vacation of six months.

A Chinese paper says that Sheng Sun Wy, Imperial Commissioner of Railways, is about to be replaced by Chang Yuk Nan, a wealthy Chinaman who made his fortune in the Straits Settlements.

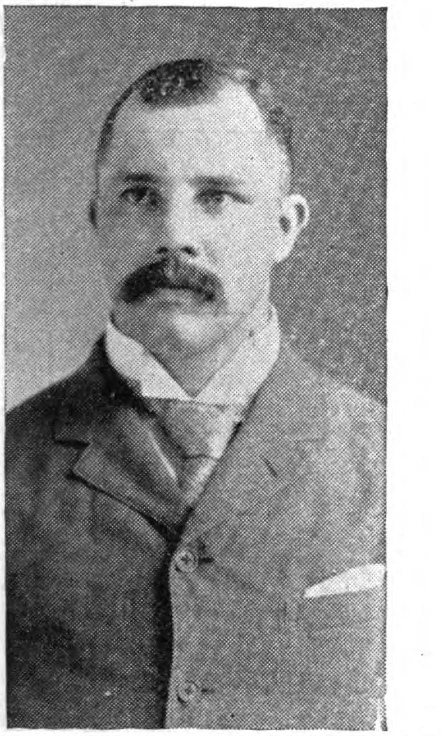
Mr. Sholom Silverstone, recently promoted from the Assistant Secretaryship of the Occidental and Oriental Steamship Company to be agent for the Harriman lines at Hongkong, has arrived at his new station. His duties include supervision of the interests of the Pacific Mail in Hongkong.

Mr. P. E. Cameron, the Calcutta agent of the Hongkong and Shanghai Banking Corporation, retires from India shortly. Mr. Cameron has been connected with the Hongkong and Shanghai Bank in the Far East for a quarter of a century, during which time he has held posts in Japan, Bombay, Penang, and Singapore, besides Calcutta.

Owing to his departure for home, Mr. H. E. Tomkins, Chairman of the Hongkong and Shanghai Banking Corporation, has resigned his seat on the Board of Directors. Mr. H. A. W. Slade, Deputy Chairman, has been elected Chairman in his place, and Mr. A. Haupt has been elected Deputy Chairman, Mr. F. Salinger, of Messrs. Reiss & Co., of Hongkong, has been appointed to the seat on the Board vacated by Mr. Tomkins.

DEATH RECORD

Mr. Arthur Pearce Bullen, Manager of the Manila (P. I.) Branch of the International Banking Corporation, died May 23d at the Philippine Civil Hospital after a protracted illness with heart and liver trouble. The remains were interred May 25th, the funeral services being conducted by Bishop Brent of the Episcopal Church. Mr. Bullen was born in



England thirty-seven years ago and spent nearly fifteen years in various cities of the Orient, from Calcutta to Manila. For ten years he was an accountant in the Singapore Branch of the Mercantile Bank of India and China, and his duties took him to nearly every city on the Malay and China coast. Coming to Manila a little more than three years ago he assumed the management of the Manila Branch of the Guaranty Trust Company, and when the business of that institution was merged with that of the International Banking Corporation, last year, he was made Manager of the latter, which position he filled to the date of his death. Mr. Bullen was highly respected in financial and commercial circles, and his death was a shock to the entire community. The deceased is survived by a mother, a brother, and two sisters, all of whom reside in England.

RAILWAYS, SUPPLIES, ETC.

TECHOW-TAKAO LINE, CHINA.—The agreement with regard to this railway is said to be approved and it will be signed shortly.

KOREAN RAILWAY.—The rails having been laid from Seoul to Wiju, the railway between those two points is open to traffic all along the line.

PEKING-KALGAN RAILWAY, CHINA.—Chan Tien-yu, the native engineer deputed by Viceroy Yuan to build the Peking-Kalgan line, started the survey.

RAILWAY EXTENSION, CHINA.—The Peking Government is considering the advisability of the immediate construction of the railway between Amoy and Foochow.

RAILWAY MATERIAL, CHINA.—A large car of railway material, consigned to the "Pehan" Railway, from Belgium, has been delivered at Tientsin by the steamer *Yunan*.

SLEEPING CAR TRAIN, CHINA.—A complete sleeping-car train is shortly to arrive in China for the "Pehan" Railway, to serve for the through traffic from Peking to Hankow and *vice versa*.

PEKING-KALGAN LINE.—This road will be built with the surplus profits of the Peking-Newchwang Railway after the bondholders have been paid, the British interests having consented to this arrangement.

PEKING-KALGAN RAILWAY OFFICIALS.—Viceroy Yuan and Hu-Yu-fen have appointed Cheng Ta-cheng Director and Lu Hsi-kwei Codirector of the Peking-Kalgan Railway. The last named official was a secretary on the railway before 1900.

RAILWAY CONCESSION, CHINA.—It is announced in Shanghai that an American Syndicate is endeavoring to obtain the concession for the building of a railroad from Hangchow, Chekiang Province, to the border of Kiangsi Province.

DAET (P. I.) TRAMWAY COMPANY.—It is reported that all the old cars, rails and other property of the Manila Electric Railroad and Light Company have been sold to the Daet Tramway Company, of Daet, Province of Ambos Camarines, Luzon.

PROPOSED SIN-MIN-FU-MUKDEN RAILWAY.—It is reported that the Japanese Government is negotiating with the Peking authorities for the building of a railway between Sin-min-fu and Mukden in Manchuria. The Japanese are anxious to start work before the heavy rains set in.

BURMA RAILWAYS.—Some of the new engines recently imported by the Burma Railways are said to have proved too heavy for the bridges between Rangoon and Toungoo. The bridges are being strengthened, but the new engines can not be used during the rainy season, and some time is lost in the cautious slowing down now considered necessary in passing over the structures.

JOHORE RAILWAY.—It is reported that this line as far as Tampin will be opened to public traffic about July 1st. The branch section to Malacca is expected to be completed by September 1st. In the meanwhile rail laying is being vigorously pushed forward from Tampin to Kuala Geman on the Johore border. The extension through Johore territory will be in the hands of the Federated Malay States Railway Department.

RAILWAY ENTERPRISE, SIAM.—It is announced that work will soon be commenced on the new railway from Tachin to Mekloug, a distance of 21 miles. The capital of the Company is 1,060,000 ticals, divided into 10,600 shares of 100 ticals each. The whole of the capital has been guaranteed so that it is probable that no shares will be offered to the public. Mr. P. B. C. Kinch is the contractor, and the work is expected to be completed within two years. The rail gauge will be one metre, and there will be eleven sleepers to a rail instead of three sleepers and a concrete foundation as on the Tachin railway. The way will be principally sand ballast.

HIGH-LEVEL TRAMWAYS, HONGKONG.—It is announced in Hongkong papers that the Hongkong High-Level Tramways Company has agreed to sell its undertaking to a new Company, which will also acquire Mr. Findlay Smith's proposed concession and carry out the scheme as projected by him of a new line to the Peak. The price to be paid to shareholders of the old Company is $200 per share payable either in cash or in shares of the new Company at shareholders' option. The new Company will be under the management of Messrs. John D. Humphreys & Son, with a consulting committee consisting of Sir Paul Chater, C. M. G., Hon. C. W. Dickson, and Messrs. Ewens and Raymond.

PENANG HILLS RAILWAY.—The report of the Directors of this Company shows that the progress of the work of construction during 1904 was highly unsatisfactory. Other arrangements for carrying out the work had of necessity to be made recently and excellent progress has resulted from the change. The rails have been laid to within 70 yards of the top of the track, but the work of adjusting has still to be done. The reservoir motor house and the lower station buildings are nearly finished. The Municipality has agreed to construct a line connecting the station with the new electric tramway to Aier Etam at a cost of $6000, half of which is being borne by the Company. The Government loan of $25,000 has now been received.

RAILWAY IN FORMOSA.—When the Japanese took over Formosa they found it advisable to take up and relay the railway, which had been laid down by the Chinese Governor Lao (1885-1891). They then (1901) built a branch 13 miles long to connect Taipeh and Tamsui and also continued the main line in a southerly direction. At the same time work was begun in the South and by the end of the year rails were laid from Takow to Tainan. At the beginning of 1905 the northern railhead extended 100 miles South from Keelung, while the southern section was 97 miles long. As the total length, including the Tamsui branch, is estimated at 260 miles, the above 197 miles, plus 13, makes 210, leaving a gap of 50 miles between the railheads. As the work is being rapidly pushed on just now this gap is expeditiously being closed up. Last month the locomotive reached Taichu (Chianghoa). By this time the hiatus left is only about nine miles, but as several tunnels and two large bridges are required it is estimated that it will be three years before the trains can run through. Meanwhile the railheads will be connected as far as possible by a temporary line.

SHANGHAI-NANKING RAILWAY.—A Shanghai correspondent says:—Without ostentation of any kind H. E. Sheng Kung Pao has fulfilled the duty which illness alone prevented him performing last June. It was called the turning of the first sod of the Shanghai-Nanking Railway, but it was rather a misnomer, because although the little ceremony was postponed nearly a year, work since last October, when the British China Corporation took over the line, has proceeded quietly and very rapidly and there are now 56½ miles of permanent way ready for the laying of metals, this distance taking the line up to Soochow, and it is hoped that by next October trains will actually be running. One great help has been the friendly relations maintained with the natives through whose districts they have passed and there have been no wearisome spells of inaction through obdurate landowners or prejudiced ignorance insisting on the fact that it was bad joss as the railway went over the tail of the Dragon who was therefore very wroth and would visit horrible punishments on the heads of the innocent and long-suffering Chinese.

RAILWAY PROFITS IN CHINA.—In response to a request of the Board of Commerce at Peking, the Chinese Director-General, Viceroy Yuan, and his assistant, Hu-Yu-fen, recently submitted a report of the accounts. In a brief history of the undertaking they point out that the whole line inside and beyond Shanhaikwan is 1800 li in length, of which the main line is from Tientsin to Shanhaikwan, thence to Hsinminfu, and the branches are the Peking-Tungchow and the Kaopantzu-Yingkow lines. The first line built was in the 7th year of Kwang Hsu, and was 21 li between Hsukochuang and Tongshan for the conveyance of coal. It was extended in the 12th year to Yenchuang and in the 14th year to Tientsin, and the other extensions followed quickly. The accounts from the 21st to the 25th year have already been reported and approved, while the records before and after Hu was in office were all destroyed in the troubles. The income from 30th day, of October, 1902, the date of the restoration of the railway, to the 31st of January, 1903, was $1,759,146, while the expenditure was $1,592,970 leaving a balance of $166,175. These figures are taken from the accounts kept in the foreign auditor's office of the railways.

CHINESE RAILWAYS.—The final contract for the Anglo-German Tientsin-Chinkiang trunk railway has now been drafted by the British and Chinese Corporation and the Deutsch-Asiatische Bank, and will shortly be formally laid before the Chinese Government. Count von Bülow's instructions to Baron Mumm von Schwarzenstein, communicated to the Wai-wu-pu, are that Germany will decline to open commercial treaty negotiations as provided by the protocol of 1901 until the final contract for this railway has been signed. The preliminary contract provided for a loan of £7,400,000 of which two-thirds was to be German and one third British. The final contract changes the terminus to Pu-kou, opposite Nanking, and increases the loan to £10,000,000, of which £6,500,000 is to be German, and £3,500,000 British, the whole to be secured on the railway, and to bear interest at 5 per cent. guaranteed by the Chinese Government. The railway, which is to be under foreign management, will join the line from Tientsin to Tsi-nan-fu, the capital of Shan-tung, and then run from Tsi-nan-fu to the southern border of the province, where the British section will continue to the Yangtsze in the hope of creating a trade between Shantung and the Yangtsze.

CHING-HAN RAILWAY, CHINA.—This important line is nearing completion. Starting from the Ch'ienmen Station, at the very precincts of the Imperial Palace at Peking, it is constructed right through the center of the Great Plain to the city of Hankow, on the Yangtsze River. It passes three provinces (Chihli, Honan, and Hupeh) and the prefectural cities of Paoting and Shunte in Chihli; Changte and Weihui in Honan. From Peking to Yellow River the track is 620 kilometers and from the Yellow River to Hankow 515.5 or nearly 1200 kilos to the whole route. For the most part the country covered is uniformly flat and no engineering difficulty of any consequence had to be faced, but on the boundary between the provinces of Honan and Hupeh the line had to be carried in a serpentine course over a very mountainous district. The highest ridge is tunnelled. There is also a short tunnel on the Southern Bank of the Yellow River at the approach to the bridge, which is now being

rapidly built. This structure will be 3.3 kilometers in length and about 20 meters in height—six above water line. There will be 102 spans (or arcs), but not of equal dimensions. Already twenty-two are completed from the south and ten from the north side. It is expected that the work will be finished in about five months. There is a staff of fifty European engineers and over 3,000 Chinese workmen employed, and the work is being rapidly pushed forward. An installation of electric light is being erected and work will go on day and night. The treachery and strength of the current, and the breadth and nature of the stream, make the bridging of "China's Sorrow" a magnificent engineering project. No caissons are built, but screw piles are driven by machinery, right down beneath the scour of the bed. When it is known that the depth of the main current is 10 metres; that in flood there is over 14 metres of water, and that there is no rock foundation in the river, the difficulty and nature of the bridging task may be appreciated.

SEOUL-FUSAN RAILWAY, KOREA.—Mr. David Davies, a well-known Welsh land-owner, recently travelling in the Far East, gives the following description of the new railway from Seoul to Fusan:—Arriving at Fusan we travelled along the new railway to Seoul, a distance of about 270 miles. The engineers have pushed on the construction with marvellous rapidity, and have accomplished their task a year earlier than they anticipated. In course of time this railway will be connected with the Newchwang-Mukden line, and thus it will be possible when the war is over to travel direct from Fusan to St. Petersburg. The journey from Fusan to Seoul is particularly interesting, and gives one a good impression of the country. Between Fusan and Teiku we passed several large lakes connected by a broad river. In former times this must have been the outlet for the infinitesimal trade which Korea indulged in, and there are still a few junks to be seen plying along the lakes. The iron bridges have been extremely well built on stone work foundations, while the part of the construction across the mountains is a feat of engineering which reminds one of the railways to Switzerland. Two ridges have to be crossed, and in each case the line makes a wide curve gradually ascending the steep slopes, and half-way up it enters a tunnel which pierces the mountain at a height of 2,000 ft. The building of this part of the line has evidently involved a tremendous amount of labor. The line is well made, and there is very little jolting. All the rolling stock has been imported from the United States; the locomotives are built by Baldwin & Co., of Philadelphia, the cars are made in Delaware, and the 90-lb. rails come from the Carnegie steel works. A great many of the stations are still in course of erection. The frame work is constructed of wood, with walls of bamboo, plastered over with mud, and the roofs tiled. Very neat they look, and so also do the Japanese houses along the railway—striking contrast to the untidy and broken-down huts in which the Koreans live. All along the line there are Japanese soldiers, armed with rifles, supervising the building of the road and the bands of coolies at work.

ELECTRIC LIGHTING, TRACTION POWER, ETC.

TELEGRAPH LINE DESTROYED, NORTH CHINA.—The telegraph line between Shiumintun and Kwangmin has been destroyed by brigands.

TROLLEY WIRE FOR JAPAN.—The Elmer P. Morris Company, New York City, has secured a large contract for trolley wire to be exported to Japan.

ELECTRIC LIGHTING ABANDONED, IPOH.—The electric lighting of Ipoh, State of Perak, F. M. S., is to be abandoned in favor of kerosene vapor lamps.

PENANG ELECTRIC TRAMWAYS.—It is confidently expected that this undertaking will be completed and in full working order before the end of the present year.

CABLE LAYING, CHINA.—A cable laying ship belonging to the Foochow Viceregal Government is now in Canton waters laying submarine cable between Canton and Foochow.

NEW POWER COMPANY, TOKYO.—An electric power company, styled the Tokyo Denryoku Kaisha, having a capital of -Y-6,000,000, will shortly be established. On obtaining its charter the Company will formally open negotiations with the Tokyo Suiryoku and Buso Denryoku Companies for taking over their business, for which an understanding already exists.

NEW JAPANESE TARIFF.—According to the new Japanese Tariff, which goes into effect July 1st, 1905, the duty on electrical apparatus and material will be increased as follows:—Electric light apparatus, instruments and parts thereof, from 10 per cent to 15 per cent; telephones and parts thereof, from 10 to 15 per cent; copper wire, from 10 to 15 per cent; submarine and underground telegraph cables, from 10 to 20 per cent.

COMMUNICATIONS IN KOREA.—The Secretary of the Japanese Communications Department is now engaged in taking delivery of the port telegraph and telephone system from the Korean Government, which task will not be completed short of a month. With regard to the Korean telephone system, there are four connections between Seoul and Chemulpo, a new line having been completed in May. The Japanese authorities will not begin the construction of telephone connections from Seoul to Fusan, Gensan, Phyongyang, and elsewhere.

ELECTRIC RAILWAYS, CHINA.—A Washington (D. C.) dispatch says that Mr. Charles H. Baker, of Seattle, Wash., has sailed for China to engage in railroad building in that empire. Mr. Baker is backed by very prominent capitalists of New York City and in the Western part of the United States and intends to build a trans-China electric railway system. The system is to be built in relays and after the method of the suburban system prevailing with the third-rail lines in New York and California. The men behind Mr. Baker are all Americans, and propose a line in conjunction with Chinese capital, to be owned exclusively by American and Chinese promoters, in competition with the other syndicates operating through China now under old concessions.

WESTINGHOUSE TURBINES FOR JAPAN.—The Japanese engineering and contracting firm of Takata & Co., Tokyo, has just placed an order, through its New York office, for a fourth 1,000-kw Westinghouse steam turbine outfit. This outfit is for the new power house of the Tokyo Electric Light Company, Tokio, Japan. Takata & Co. have recently shipped out the first two of these machines, and the remaining two will be shipped out some time within the next four to five months. The generators are wound for three-phase, 50-cycle, 3,500 volts. They operate at 1,500 r. p. m. The stationary armature is wound for 3,500 volts between line wires and about 2,000 volts between line wire and neutral. This neutral is brought out for operating a three-phase, four-wire lighting system.

ELECTRIC PLANT IN FORMOSA.—In the early part of 1904 the Engineering Department of the Formosan Government commenced work on the construction of an electric plant on the upper course of the Shinten River, about 10 miles to the South-east of Taihoku. The site selected is immediately below the junction of the Hokusei and Nansei Rivers, which form the Shinten. Water power will be used, and will be supplied by a canal cut from the upper source of the Nansei River (South branch), which flows down the mountains in a series of cascades. Just above the junction the course of this stream describes a reversed S, which may be used to illustrate the construction of the canal, from the upper point of the figure to its centre, where the water is brought to the opposite side of the river by means of syphon pipes, thence to the lower point of the figure to the site of the plant, where it will have a fall of about 50 ft. The length of the canal is 7,200 ft., which includes a tunnel of 220 ft., and 280 ft. of two-row syphon pipes, each 5 ft. in diameter. The width of the canal at the bottom is from 11 to 12 ft., and the discharge will be 250 cubic feet per second. This is intended to give 1,000 horse-power, but 650 horse-power will be sufficient for the present requirements. The plant will be equipped with two McCormick turbines, each of 884 horse-power and 450 revolutions per minute, two 3-phase Westinghouse alternating generators of 250 kilowatts, 11,000 volts, and 450 revolutions per minute, a McCormick exciter turbine of 49 horse-power and 950 revolutions per minute, and a Lombard governor, type D. Considerable delay has occurred in the arrival of some of the equipment from the United States, and the plant will not be completed before June or July, 1905. It will supply the electric power for lighting the cities of Taihoku and Daitotei (Tamsui), also for an ice plant, sawmill, and other works, in the city first mentioned. The cost, including the construction of the canal, will be approximately $175,000.

WATERWORKS AND IRRIGATION

RECLAMATION OF WASTE LANDS, KOREA.—The Department of Agriculture, Commerce, and Industry at Seoul has promulgated the regulations relating to the reclamation of waste land, according to which no Korean who has obtained reclaiming rights will be allowed to sell or mortgage those rights. Those holders of rights who do not begin the work of reclamation within a year will forfeit same.

IRRIGATION IN INDIA.—The Secretary of State for India has sanctioned as a productive public work a project estimated to cost Rs. 18,60,000 including indirect charges, for irrigating Divi Island at the mouth of the Kistna River in the Madras Presidency, by raising water from the river by means of centrifugal pumps driven by Diesel oil engines. It is estimated that the project will irrigate 50,000 acres of land and the net revenue anticipated is Rs. 1 76 658 per annum, which is equivalent to a return of 9.50 per cent on the total capital outlay.

BUILDINGS

RAILWAY OFFICES, KUALA LUMPUR.—The new railway offices at Kuala Lumpur have been completed.

PETROLEUM STORE, SELANGOR, F. M. S.—Tenders for the construction of a large Petroleum Store have been called for.

NEW MUNICIPAL OFFICES, CALCUTTA.—The New Council Chamber will probably be first used for official business, next month.

SERUM LABORATORY, SIAM.—The Siamese Government has appropriated the sum of Tcs. 16,000 for a new serum laboratory, to be built at Phrapatom.

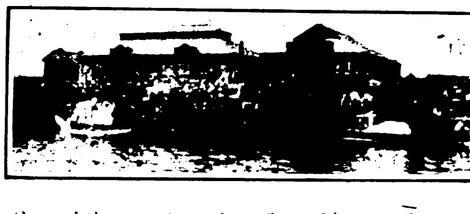
IMPERIAL LIBRARY, UYENO, JAPAN.—The new building of the Imperial Library, which has so far cost -Y-320,000, will be completed about September of the present year.

LEGATION BUILDINGS, KOREA.—The Chinese Minister to Korea has applied to his Government for Tls 60,000 for the purpose of constructing suitable legation buildings at Seoul.

NEW PRINTING STRUCTURE, TOKYO.—The printing office of the Hakubun Kan, publishers in Tokyo, which was destroyed by fire last Autumn, has been reconstructed on its former site and the premises occupied.

ARSENAL WORKSHOPS, ITABASHI, JAPAN.—The machinery and plant in the Military Arsenal at Koishikawa Japan, have been removed to the new workshops covering 120,000 *tsubo*, at Itabashi. The Government, is also constructing an electric railway between Itabashi and Otsuka for the transportation of the products of the arsenal.

CORNABE, ECKFORD & CO'S GODOWNS, CHEFOO.—Messrs. Cornabé, Eckford & Co., of Chefoo and Wei-hai-wei, North China, have just opened splendid new godowns at Chefoo, which are now in the full flood of business. Reference was made several months ago by THE FAR EASTERN REVIEW to these buildings while they were in course of construction, and now,



through the courtesy of the firm, this paper is enabled to present herewith an illustration of the improvement. Messrs. Cornabé, Eckford & Co's scale of prices for storage of goods in these godowns shows that the firm is able to store and look after any shipments which may be made from any part of the Orient to Chefoo.

BRIDGES

INDIAN BRIDGE BUILDING.—It is announced that an important contract for the erection of a large viaduct at Khushalgarh, over the River Indus, has just been secured by the Teeside Engineering Company, of Middlesbrough. Early delivery was an important feature in the placing of the contract by the India Office, and the contractors will ship from the Tees to Bombay the greater portion of the steel work comprised in the structure during the course of the present year.

PUBLIC WORKS

PROTECTIVE WORKS IN MADRAS.—In view of the prevailing distress in the Madras Presidency of India on account of the failure of the Northeast monsoon, the Madras Government has requested the President of the local boards to start as early as possible all ordinary works provided for in the budget estimates for 1905-6, which are suitable for the employment of unskilled labor, and to push them forward to completion by the time the next South west monsoon sets in.

HONGKONG DRAINAGE WORKS.—The Director of Public Works in his report for 1904 says that during that year the sewers and nullahs were cleansed and maintained in a satisfactory condition. Considerable cost has been entailed in clearing out the sand washed down by heavy rains in some of the nullahs, more especially in Kowloon. A large amount of this sand comes from the spoil of quarries from the neighborhood and, where this is found to be the case, the lessees of the quarries have been called upon to clear it away. The flushing tanks on the sewerage system have been regularly operated at low tides and have assisted to keep the sewers clean. The large one erected last year behind the Volunteer Headquarters has been of great assistance in keeping the sewers in Queen's Road, to the east and west of Garden Road, clear, and has worked well by greatly increasing the velocities in these pipes. The further construction of flushing tanks in suitable positions on this system had to be held over, owing to the large amount of new work going on for Water-works.

PORT WORKS, DREDGING, DOCKS, ETC.

BORNEO WHARF, SINGAPORE.—The name of this pier has been changed to Jardine's Steps.

STAR FERRY PIER, KOWLOON.—The new pier of the Star Ferry Company, Ltd., Kowloon, will probably be opened for traffic next December.

KARACHI (INDIA) PORT TRUST.—Proposals have been called for in England for the structural iron work required in the iron ship wharf extension.

WELD QUAY, PENANG, S. S.—The Legislative Council of the Straits Settlements has authorized the expenditure of an additional sum of $30,000 for the completion of the reclamation of this quay. The original estimate for the work was $157,764.

HARBOR WORKS, FUSAN.—The Seoul-Fusan Railway Company intends to begin the construction of harbor works at Fusan as soon as possible. It is estimated that this improvement will cost at least-Y-150,000.

BREAKWATER AT KUNSAN, KOREA.—A contract for the construction of a breakwater at Kunsan, Korea, has been signed between the Inspector-General of Korean Customs and a certain Japanese firm. The works will shortly be started.

TANJONG PAGAR DOCK COMPANY, SINGAPORE.—It is announced that the Managing Director of this Company has notified His Excellency the Governor of the Straits Settlements that it is the intention of the British Government to take over the Company's undertaking from June 30, 1905.

SURVEY FOR HARBOR IMPROVEMENTS, SINGAPORE.—The additional sum of $28,370 has been appropriated by the Straits Settlements Government for carrying out the engineering surveys and preparations of reports in connection with the proposed Harbor Improvement Scheme for Singapore.

DEEPENING CHEFOO HARBOR.—The work on the new Chinese bund which has been temporarily suspended is likely to be resumed at an early date, says the *Chefoo Daily News*. There is now a proposition on foot to continue the reclamation work by filling in the space with dredged material from the harbor immediately in front of the bulkhead. A dredger for this purpose will have to be brought from Hongkong or Manila. It is figured that dredging the necessary material for the filling will be less expensive than hauling sand from the hills at the west side of the harbor.

NEW DOCK ENTERPRISE, SHANGHAI.—Henceforth the Kiangnan Arsenal and Engineering Works, according to the *North China Daily News*, will be conducted as entirely separate affairs, and while the Chinese Government will continue to run the arsenal under its present management, the dock and engineering department becomes, under the title given above, a purely commercial undertaking. The joint foreign managers of the new undertaking will be Mr L. Basse and Mr. R. B. Mauchan, the present Superintendent of the International and Cosmopolitan Docks. Mr. Rawsthorne, the senior boiler-maker of Messrs. C. S. Farnham, Boyd & Co., Ltd., also joins the Chinese venture.

CANTON (CHINA) RIVER BARRIERS.—The steam dredger *Canton River* has commenced work at the Taishek Barrier, the operations being started at a position 400 feet to the South of the present beacons. Captain Harris and Mr. J. W. McGregor have been detached from the revenue cruiser *Feihoo* to especially supervise the removal of the artificial obstructions which, it is believed, will take another eighteen months. Tons of stone and granite have been raised from the Taishek Barrier with much appreciable difference. Two European divers are employed in the work, and a most efficient staff is engaged, with headquarters at Whampoa. Nothing in the front "reach" has so far been touched.

LAUNCH OF FLOATING DOCK, NAGASAKI.—It is usual to launch such docks in sections and this is said to be the first time on record that one has been launched entire. The new dock comes from the Tategami Yard of the Mitsu Bishi Dockyard and Engine Works. The laying of the keel blocks was begun on March 24th, 1904, and the dock is now about completed. Following are the dimensions:—Lifting power, 7000 tons; length, 387 ft. 6¼ in.; length, 412 ft. 6½ in.; breadth, 85 ft. 6½ in.; depth, 42 ft. 1½ in. The dock will accommodate the largest of the merchant vessels owned in Japan, also Japanese men-of-war which do not exceed 7000 tons displacement and draw not more than 21 ft. of water. The dock will be taken to Kobe, where the Company is establishing a repair yard.

TANJONG PAGAR DOCKS, SINGAPORE.—The preparation for submitting the Tanjong Pagar Dock transference to arbitration are being carried out with a despatch which would imply that both parties are fully alive to the desirability of arriving at a settlement at the earliest possible moment, says a Singapore paper. By the last English mail arrived Mr. W. E. Moulsdale, ex-Manager of Tanjong Pagar, who has come out to assist the Company in getting the case ready for presenting to the arbitrators. Several of the higher employees of the Company, especially Mr. J. Stuart M. Rennie, Assistant Secretary, are also working up valuations and statistics. On the Government side Mr. L. M. Woodward is doing similar work. Messrs. Swan and Maclaren have been retained by the Company as expert advisers. Mr. S. Tomlinson, we understand, will act in a similar capacity for the purchasers in the matter of lands and buildings. We hear that Mr. Charles Arthur Cripps, the eminent K. C., is coming out to Singapore in connection with the arbitration proceedings. The names of several local professional men are also mentioned as having been retained to act in one capacity or another in the preparation or presentation of the case on either side.

SHIPBUILDING, MARINE, ETC.

HONGKONG-CALCUTTA LINE.—Messrs Jardine, Matheson & Co. are placing a new steamer of about 7800 tons on the Hongkong-Calcutta run.

JAPANESE BATTLESHIP "KATORI."—This new warship will be launched on July 4th at Barrow-on-Furness, and will be christened by Princess Arisugawa.

HULKS IN KOWLOON DOCKS.—The hulks of the *Marques del Duero* and *Maria Cristina*, which left Manila May more than a month ago, will be refitted at the Kowloon Docks.

STEAMER "SABAH" SOLD.—The steamer *Sabah* has been sold by the Sabah Steamship Company of Sandakan, B. N. B., to the South Philippines Steamship Company for P-65,000.

NEW STEAMSHIP "DAKOTA."—It is now announced that the new Great Northern steamer *Dakota*, will arrive in the Orient on her maiden voyage to the Far East, early in July.

STEAMER "KOLPINO" SOLD.—The steel steamer *Kolpino*, 2352 tons gross. 1533 tons net, built and engined by Messrs. R. Stephenson & Co., Newcastle, in 1889, has been sold to Japanese owners.

TENDER LAUNCHED AT SHANGHAI.—The Shanghai Tug and Lighter Company's new tender *Alexandra*, which has been built by the International Dock of Messrs. Farnham, Boyd & Co, Ltd., has been successfully launched.

NEW SALVAGE BOAT, HONGKONG.—The new salvage boat *City of Birmingham* has arrived in Hongkong. She was bought by Messrs. Jamieson & Co for salvage work on the China Coast. The vessel is 160-tons register.

U. S. A. T. "BUFORD" DOCKED.—The transport *Buford* has been placed in the docks at Hongkong for repairs incident to her recent accident on the reefs opposite Malabang, Mindanao. The extent of her damages has not yet been given out.

"INVICTA" WITHDRAWN FROM AUCTION.—This steamer, which was put up for auction at Shanghai recently, was withdrawn at the highest bidding. The price reached was Tls. 13,000, which was considerably below the reserve price fixed by the owner.

SALVAGE STEAMER PURCHASED.—The Japanese Government has bought, for use at Port Arthur, from the Neptune Salvage Association, of Stockholm, the salvage steamer *Herakles*, and her Swedish crew have sailed with her for the Far East. She is insured for £32,000.

CHINA NAVIGATION COMPANY.—With the sale of the *Hoihow* and *Tamsui* the China Navigation Company will have disposed of seven steamers, some of which are among the pioneers of the line and for all practical purposes out of date. The Company has six steamers being built.

NEW DEPOT SHIP, HONGKONG.—H. M. S. *Hecla*, which was commissioned at Portsmouth early in March for service as a torpedo-depot and repair ship on the China Station, has arrived at Hongkong. She was recently refitted throughout and her workshop brought up to date.

INDO-CHINA STEAMER.—The fleet of the Indo-China Steam Navigation Company, Ltd., will shortly be increased by a large steel screw steamer. The *Ku'sang* is 400 ft. in length by 51 ft. in breadth, and will carry a large cargo as well as having accommodation for both European and Chinese passengers.

STEEL FURNITURE FOR WARSHIPS.—All the ships of the United States Navy are being supplied with steel furniture. Experiments carried on for several months have proved that almost all the essential furniture of warships can be made of steel. Serious damage was done during the Spanish-American War by the furniture of ships catching fire, the cruiser *Baltimore* having suffered severely in the Battle of Manila Bay.

OPEN PORTS, PHILIPPINES.—The Philippine Civil Commission, by administrative act, has authorized the Governor-General of the Islands to declare all ports and places in the Archipelago open to vessels regularly licensed to engage in the coastwise trade, and no entrance or clearance to or from such ports will be required. The Governor-General, however, may close by proclamation any such port or place, if necessity demands.

"SULLY" COFFERDAM.—The cofferdam built by the Hongkong and Whampoa Dock Company to endeavor to float the French cruiser *Sully*, was safely towed to its destination in the Bay d'Along, where the cruiser is still on the rocks, by the tugboats *Robert Cooke* and *Robert K*, the latter the property of the Atlantic, Gulf and Pacific Company. The last report from the scene of the wreck was to the effect that the cofferdam was leaking badly.

SUNKEN VESSELS AT PORT ARTHUR.—The idea of damming Port Arthur harbor and draining out the water so as to leave the sunken ships high and dry has been abandoned by the Japanese engineers. The plan proved unpractical owing to the number of rivers that flow into the harbor. More ordinary measures are to be adopted, and among them is the purchasing of a specially constructed and equipped vessel which will assist the work of salvage.

CHINA'S GREAT NEW NAVY.—China is preparing to build a great navy. Sir Robert Hart, the Director-General of Imperial Customs, has submitted a plan whereby the revenues of the Empire from customs and internal taxes will be increased from about $76,000,000 to $284,000,000. With the additional money thus obtained, Sir Robert proposes to build twenty ironclad battleships, twenty armored cruisers, and 120 torpedo boats, all to be constructed within ten years.

MOTOR BOAT TEST, KOWLOON.—A 30 h. p. light draught motor boat, the *Lungchow*, built at Messrs. W. S. Bailey & Co.'s yard at Kowloon, for commercial purposes on the West River, was given a successful test recently. The motor with which the *Lungchow* is equipped is a 3-cylinder one worked by kerosene. This is converted into gas which is exploded by an electric magnet. The engine is kept from overheating by a small pump which forces water through. The shafting is fitted with a Hele-Shaw clutch for disconnecting from the motor. A still bigger motor boat of 45 h. p. is being constructed at Messrs. W. S. Bailey & Co.'s yard, also to be used for commercial purposes on the West River.

TURBINE STEAMERS, INDIA.—The *Lunka*, *Linga*, and *Lhassa* class of turbine steamers which the British India Steam Navigation Company is now putting into service brings Indian coasting mail services well up to date. The somewhat cramped dimensions of this new class of ships is said to be dictated in part by the configuration of a certain berth in the Bombay Docks. The owners are to be thoroughly congratulated on their enterprise in this departure. They are likely, we fear, to find their new ships heavy on the coals, if not regular fire-eaters. As far as we can learn, they do 16½ knots quite comfortably and can do, or at least upon trial trips have done, 18 at a pinch. They have very prettily modeled hulls, and indeed are quite a credit to all concerned, and their motion in a moderate seaway is said to be very notably easier than that of 12-knot vessels of their size with either single or twin screws. How long—in locomotive parlance—they will keep out of the shops is a point of much interest at present on the knees of the gods. It is clear they can't well strain themselves by racing unless they first turn bottom-up.—*Indian Engineering*.

MINES AND MINING

TRONOH MINES OUTPUT.—The annual output of the Tronoh Mines for the past six years has been furnished us, says the *Times of Malaya*. The figures have not been published hitherto.

BEFORE FLOTATION.

	Piculs.	
1899	5,162.01	(10 months' working.)
1900	8,948.66	(11 " ")
1901	6,996.89	(8 " ")

AFTER FLOTATTION.

	Piculs.	Value.
1902	14,898.74	$ 692,818.55
1903	19,033.56½	885,844.76
1904	32,430.33	1,369,426.05

GERMAN DEMAND REFUSED.—The Korean Foreign Office has formally refused to acquiesce in the demand of the German Minister at Seoul for the concession of the Towon gold mine.

SOFT COAL, HONAN.—A seam of soft coal has been found in Honan, which is being worked by natives, and a contract has been made with the Chinghai Railway to supply all the fuel it needs.

GOLD STRIKE IN BENGUET, P. I.—It is said that a 4-foot ledge, which can be traced on the surface for 6000 feet and which gives an average assay of $43 per ton of gold, has been found in the Province of Benguet, Luzon, P. I.

SYUN-AN GOLD MINE, KOREA.—Mr. Kihachiro Okura, a Japanese mine operator, has requested the Japanese Minister at Seoul to obtain for him the right to work the Syun-an gold mine in Korea. All the necessary investigations with regard to working the mine have been made.

MINERAL DISCOVERIES, BORNEO.—The British North Borneo Company has received notice of the discovery in the territory of Borneo it controls of important mineral deposits, coal and iron. The iron-ore deposit covers a large area, while at Jambongan smokeless coal has been found in quantity.

PLACER DREDGING, PHILIPPINES.—The big gold mining dredge of the Philippine Mining Company is now in operation on the Company's placer fields on the Lanang River, Island of Masbate, P. I. A letter received in Manila from one of the miners on the ground says that the diggings look good.

RAUB (F. M. S.) MINES OUTPUT.—The result of the work at these gold mines for the four weeks ended May 20th, 1905, was as follows:—Bukit Koman: stone crushed 3,282 tons; gold obtained 576 oz; average per ton 3.51 dwts. Bukit Malacca: stone crushed 1,814 tons; gold obtained 131 oz, average per ton 1.44 dwts.

TIN MINING CONCESSION, KELANTAN, F. M. S.—A large and valuable concession of tin mining land in a place called Klian Intan, in Kelantan, just on the borders of the new territory acquired by Perak, has been granted to some European capitalists and a syndicate is being formed for the purpose of prospecting the land in a thoroughly business like-manner.

NEW WATER BOAT, HONGKONG.—The Hongkong Steam Water Boat Company has just received from the contractors, Messrs. D. Macdonald & Co., a new water boat, capable of carrying 250 tons of water. The vessel is divided into water-tight compartments with steel bulkheads, and is fitted with a pump which has a capacity for pumping 40 to 50 tons of water per hour.

ORIENTAL-MASBATE GOLD MINING COMPANY, PHILIPPINES.—This corporation was organized in San Francisco, Cal., and holds what are believed to be rich placer fields on the Gillabatean River, Island of Masbate. One shipment of its first big dredge arrived here on the *Coptic* the present month, and Mr. W. S. Gray, President of the Company, will arrive in Manila with the balance of the machinery at an early date.

CHANG YEN-MAO MINING LITIGATION.—In reply to a recent Memorial of Viceroy Yuan Shih-kai asking what he is to do in regard to Chang Yen-mao in connection with the latter's litigations in England, the Peking Government has commanded the Viceroy to keep a strict supervision over the former Director of the Kaiping Mines, and see to it that he be compelled to recover entire control of the mines in question from foreign management.

BORNEO OIL.—The Shell Transport and Trading Company reports that statistical tables received from the oil fields in Borneo for the first thirteen weeks of the current year show the following results:—Production of crude oil in 1905, 95,070 tons, against 53,270 tons in 1904. The output of the refinery was 23,340 tons of kerosene and 30,260 tons of other products, as compared with 15,115 tons of kerosene and 23,265 tons of other products in 1904. The crude oil in store was 33,430 tons in 1905, as against 20,330 tons in 1904.

BESSHI COPPER MINE, JAPAN.—The Besshi copper mine is the second largest copper mine in Japan, employing 5,075 officials and hands, all Japanese. The area of the mine is estimated at 5,415 acres, including

the metallurgical works. In addition to smelting and refining works there are extensive workshops, fitted with all the appliances necessary for constructing machinery, boilers and heavy castings, as well as for making repairs to the machinery now in use. The appliances include a hydraulic riveter, planing machine, bolt making machine, etc. Castings weighing as much as five tons have been turned out from these works, where also a great part of the machinery and plant used at the mine is constructed. A large electrical plant is being erected, which when completed will supply motive power for all the trolley cars, trams and machinery in use at the mine.

COPPER MINES IN CHINA.—The Director of the Chief Commercial Guild in Shanghai has petitioned the Minister of Southern Trade with regard to the copper mines of China and suggesting that the provinces shall raise money to work them. Though the minting of copper money is going on in China the copper has to be imported from foreign countries. As the demand for copper coinage becomes greater the price of copper will rise, until minting may in future be suspended because of lack of material. China is vast in area and rich in minerals, but at present only a small quantity of copper, sufficient to supply Peking, is produced from a mine in Yunnan, but funds must be raised and the mine worked on a new method so that more copper may be obtained. Copper has also been obtained in Szechuan, which has been found to be good, and also in Kiang-nan, but is not worked because of want of capital. The Director asks the Throne to order the provinces to put aside two-tenths of the profits of minting to be saved for five years to form the nucleus of a capital to form a colossal company to work the copper mines.

MINERALS IN MANCHURIA.—In *La Géographie* some account is given by Mr. J. Deniker from a Russian work by M. Anert of minerals in Manchuria. He notes particularly the veins and gold mines of Tia-pi ku, which are found in the valley of the Wei-sha-ho, an affluent of the Sungari. It is the centre of one of those free communities so numerous in Manchuria which exist in full independence of the Chinese authorities, and work the mineral riches of the district over which their power extends. The vein is rich, and contains, besides auriferous sand, nuggets in the rock. There are many such in Manchuria. In one of the lateral valleys of the Sungari a ton of sand gives 17 to 35 grammes of gold; the vein in the rock is richer, but the gold is of an inferior quality, known as "white" gold. The coal seams are very numerous, and are described in detail; the best are to the south-east of Kirin and also on the west of that city, near the route to Kwan-cheng-sze, besides those near Mukden and to the east of Tieh-ling. The writer notes also the copper, argentiferous lead, and iron mines which abound in certain parts. —*London and China Express.*

KOLAR GOLD FIELD, INDIA.—Following are the returns for the month of April, 1905:—*Balaghat.*—3,920 tons of quartz crushed yielded 3,131.44 oz., 2,750 tons of tailings cyanided yielded 257.22 oz., making a total of 3,388.66 oz., as compared with 3,384 oz. of bar gold in March. *Champion Reef.*—Milled 18,900 tons which produced 16,211 oz., 13,194 tons of tailings treated by the cyanide process produced 1,956 oz. of gold and accumulated collection from plates, No 2 Mill, shut down 19th of April, 1,425 oz., making a total production of 19,592 oz. as compared with 18,329 oz. in March. *Hutti.*—(Nizam's) 1,050 oz. of gold from 1,900 tons of quartz crushed, as compared with 1,059 oz., in March. *Mysore.*—16,200 tons of quartz crushed produced 15,247 oz., 13,6 0 tons of tailings cyanided yielded 1,575 oz., making a total production of 16,822 oz. of gold, as compared with 17,360 oz in March. *Mysore West.*—Mill ran 682 hours, crushed 1,972 tons and yielded 1,002 oz. bar gold. *Nundydroog.*—6,520 tons of quartz crushed yielded 5,510 oz., and 5,018 oz. of tailings cyanided yielded 5,7 oz., making a total yield of 6,027 oz. of gold, as compared with 6,057 oz. in March. *Oregum.*—Stuff crushed 10,119 tons, gold produced 4,357 oz. and slimes and tailings cyanided 10,720 tons yielded 1,141 oz., making a total production of 5,498 oz., of gold, as compared with 5,491 oz. in March.

BESSHI COPPER MINE, JAPAN.—The British Minister at Tokyo, Sir C. MacDonald, has forwarded a report on the Besshi Copper Mine. This mine is situated in the Ehimé Prefecture, in the Province of Iyo, to the North-west of the Island of Shikoku. The area of the mine and contingent metallurgical works is estimated at 5,415 acres; it is the second largest copper mine in Japan, employing 5,055 officials and hands, all Japanese. In addition to smelting and refining works, there are extensive workshops, fitted with all the appliances necessary for constructing machinery, boilers, and heavy castings, as well as for making repairs to the machinery now in use. The appliances include a hydraulic riveter, planing machine, bolt-making machine, etc. Castings weighing as much as five tons have been turned out from these works, where also a great part of the machinery and plant used at the mine is constructed. A large electrical plant is being erected which, when completed, will supply motive power for all the trolley cars, trams, and machinery in use at the mine. There are three steamers and 51 sailing vessels belonging to the works; 20 new sailing vessels are to be acquired during 1905. The amount of refined copper produced by the works during the last four years was: 1901, 4,500 tons; 1902, 4,800 tons; 1903, 5,500 tons; 1904, 5,000 tons.

IMPROVEMENTS IN THE PHILIPPINES

PUBLIC WORKS.—The Philippine Commission has passed an act appropriating the sum of -P-4,898,794 08, Philippine currency, from the funds realized from the sale of Public Improvement Bonds, for certain public works and permanent improvements of the Insular Government, as follows:—*Office of Public Works.*—For completion of existing contracts for the new harbor of Manila, and for the continuance of the improvements of the Pasig River, and incidental expenses until July 1st, 1906, -P-2,246,000. For completing the improvements of the Port of Cebú, -P-1,080,000. For completing the improvements of the Port of Iloilo, -P-483,000. In all, for the Office of Public Works, -P-3,809,000. *Improvements of the Pasig River Front.*—For completing the improvement of the Pasig River front in the city of Manila along Calle Maestranza to a point near de Almacenes Gate, -P-669,060. *Bureau of Engineering.*—For the construction of a bridge at Parañaque, Province of Rizal, -P-13,000. For the construction of bridges upon the Indang-Silang Road, Province of Cavite, -P-10,600. In all, for the Bureau of Engineering, -P-23,600. *Bureau of Coast Guard and Transportation.*—For continuing the construction of light stations at Capitancillo Island, Bajo Apo Islet, Bagacay Point, Manigun Island, and Cape Bolinao, and for the construction and completion of other minor stations, the purchase and installation of port lights and lanterns, and necessary surveys, -P-230,000. For general improvement of Engineer Island, Manila, including the completion of an artesian well, purchase and installation of hoisting derricks, tramway, tracks, and cars; small wharf for Coast-Guard cutters; a shed and power house, and other new construction for the equipment of the Coast-Guard plant; for filling and cleaning island, hauling sand and gravel, removing débris, etc., -P-31,000. For completing the construction and equipment of marine railway, and for machine shop on Engineer Island, -P-14,000. In all, for the Bureau of Coast-Guard and Transportation, -P-275,0 0. *Bureau of Prisons.*—For the improvement of Bilibid Prison by the construction of a stone pavilion, warehouse, carriage and blacksmith shop, lumber shed, boiler house and dry kiln, stone wall surrounding said buildings, etc, and equipment of stone quarry at site to be selected, -P-1,000,000. *Benguet Improvements.*—For reimbursement to the general funds of the Insular Treasury for the completion of construction and repairs of Benguet Road, -P-425,000. *Quarantine Service.*—For the purchase of disinfecting machinery and equipment for the Quarantine Station, Cebú, -P-18,723.15. *Bureau of Architecture and Construction of Public Buildings.*—For the alteration, construction, or improvement of the following named public buildings:—Civil Sanitarium and cottages, Baguio, Benguet—For the completion of addition to sanitarium, and additions to present cottages, including roofs on cottages and other buildings, -P-34,220.77. Bureau of Prisons—For completion of construction of warehouses and workshops, -P-825.02. Board of Health—For construction of stable and sheds at San Lazaro, -P-777.78. Bureau of Coast-Guard and Transportation—For construction of warehouses and machine-shops and warehouse buildings, alterations and repairs of buildings, water mains and electric wiring, on Engineer Island, -P-3529 94. Bureau of Customs and Immigration—For completion of iron fence enclosing premises, standpipes, and hose connections, electric lighting and wiring, etc., -P-25,193.49. Bureau of Insular Purchasing Agent—For additions to and alterations of corral at San Lazaro, and construction of three large coal sheds at Cebu, Iloilo, and Romblon, -P-7883.22. Bureau of Government Laboratories.—For the new laboratory building, including equipment of mechanical equipment and construction of desks and fixtures, driveways and walks, filling, grading, and parking of the grounds, -P-8489.82; and for the serum laboratory, including completion of houses for small animals, cement drains, and stables, -P-5274.04; total -P-13,763 86. Quarantine Service, Cebú—For the construction of buildings and wharves, -P-41,466.85. Bureau of Education—For the construction of domestic science building for the Normal School of Manila, -P-28,000; for a model training school for Normal School of Manila, -P-12,000; and for the construction and equipment of a cosmopolitan school building at Manila, -P-20,000; total, -P-60,000. In all, for the Bureau of Architecture and Construction of Public Buildings, -P-187,470 93.

MISCELLANEOUS NOTES

STEAM PLOUGHING, BURMA.—Experiments with steam ploughing in Burma are reported to have shown that the crop of rice on a given area can be doubled by deep ploughing.

AMERICAN EXPORTS TO FAR EAST.—The exports from San Francisco to the Far East during 1904 amounted to $20,647,527 as against $10,846,151 in 1903, or nearly doubled in one year.

ENGINEERS' ASSOCIATION, SINGAPORE.—The members of this esteemed organization have opened pleasant club rooms. A bar has been installed, and there is a reading room, a billiard table and a good piano.

GUNSTOCK CONTRACT, JAPAN.—An order was recently placed with a manufacturer in Grand Rapids, Iowa, U. S. A., for 500,000 gunstocks for the Japanese Government. Shipment is to be made by Pacific Coast port.

TOBACCO FACTORY, NANKING.—The Viceroy of Liang-kiang Province has notified the Board of Commerce at Peking of his intention to start a tobacco factory at Nanking. He has Tls. 40,000 capital for the purpose.

VAPOR-GENERATING LAMPS.—The Selangor (F. M. S.) Government has granted to Mr. F. A. Turner, of Singapore, exclusive privileges under the Inventions Enactment in respect of an invention for improvements in or connected with vapor-generating lamps for hydrocarbon, oil, or spirit.

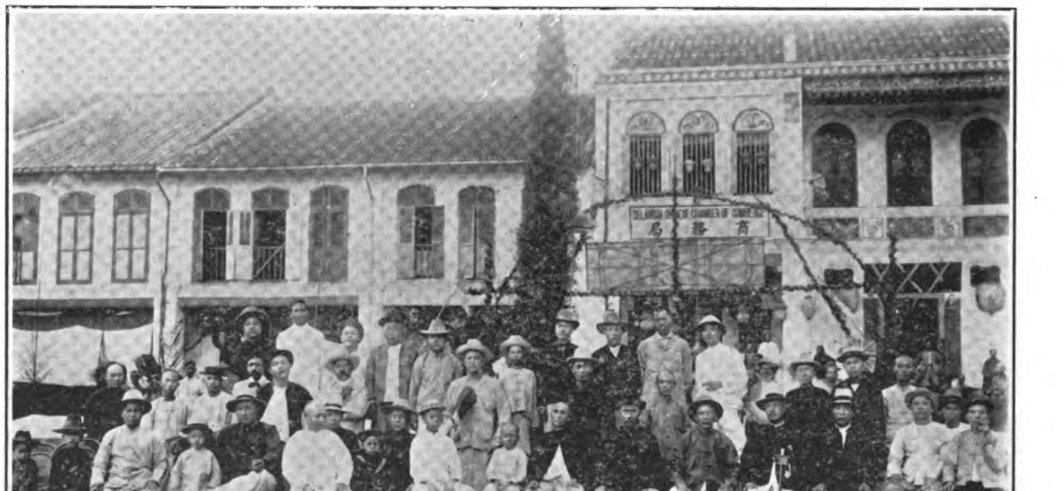
COLD STORAGE PLANT, KOBE.—Mr. Nakahara Kotaro, who has for eight years conducted a cold storage undertaking at Yonago, Tajima Province, Japan, is about to set up a cold storage plant in Kobe. The enterprise, which has a capital of -Y-100,000, will be commenced in the early part of July.

NAVAL BRIQUETTE FACTORY, JAPAN.—The various preparations in connection with the naval briquette factory, newly established at Tokuyama, Suho Province, Japan, are making fair progress. The machinery is now being erected. The daily product of two factories is estimated at about 750 tons.

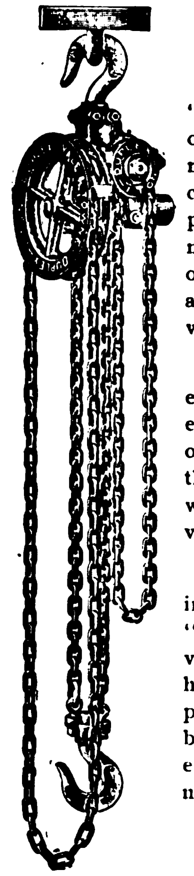
KALLANG TUNNEL, SINGAPORE.—The contractors for this work have been granted an extension to the end of November next of the time for completion, in consequence of the use of a steel shield having been decided upon. The contractors have announced that they can not carry out the work under the present system and have resolved to adopt a steel shield at their own expense. The materials have been ordered by them.

SUGAR MILL EQUIPMENT, JAVA.—Several sugar estates in Java have recently established grinding plants equipped with the best and most modern machinery. One of these mills is in the Residency of Djolkjakarta, another in Kediri and a large central factory is projected in the Residency of Passaroean. The indigo industry in Java is constantly on the decline, which has caused a number of planters to turn their attention to sugar instead.

SELANGOR CHINESE CHAMBER OF COMMERCE.—On the occasion of the first anniversary of the organization of their board of trade, the members of the Selangor Chinese Chamber of Commerce at Kuala Lumpur, F. M. S., recently sat for a group photograph which is herewith presented. This commercial body is one of the very few strictly Chinese boards of trade in the world, and from the report submitted at the annual meeting it is gathered that its future usefulness and stability are assured. There were seventy members when the Chamber was inaugurated, according to the report, and there are at present 120 members on the roll. The organization occupies new and commodious quarters, it issues an official bulletin more or less weekly and seems to have the hearty cooperation of the entire community in which it thrives. The officers for the current year are the following:—Chairman, Towkay Loke Yew; vice-Chairmen, Towkays Chan Sow Lin, M. C., and Wee Hap Lang; Honorary Secretary, Mr Sau Ah Wing; Honorary Assistant Secretary, Mr. Toh Nam.



THE HANDY DUPLEX



The Yale and Towne "Duplex" Block is made of the same quality of material and with the same care as the famous "Triplex." It is 25 per cent more powerful than any other screw hoist made, and gives great efficiency with ease of action.

The "Duplex" is light enough to be carried about easily, either in the mine or shops. It is so compact that it will work in places where the headroom is very cramped.

For lifting timbers, tubing or machinery, the "Duplex" is specially convenient; where loads are handled often the "Triplex" will be found the best, because of its higher efficiency, which saves the men.

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CABLE ADDRESS, "MARINEWORK"

ENGINEERING SCHOOL, PEKING.—It is announced that the Minister of the Board of Commerce, Peking, proposes to establish a mining and engineering school for the instruction of the minor officials of the board. Foreign instructors will be engaged for the teaching of geography, railway building, engineering and mining. Those who have perfected their studies will be sent to take charge in the railway and mining works in the various provinces of China.

OPENING PORT OF HSIAKUAN, CHINA.—The Peking Government has granted the petition of the Viceroy of Liangkiang to use Tls. 100,000 of the Nanking Opium Revenue to meet the expenses of opening the Port of Hsiakuan, a new trading center near Nanking. Foreigners as well as Chinese will be allowed to lease land and build there, and all the most important works are to be taken in hand for the development of the place immediately.

THE BOMBAY MILLS.—The Bombay mills employ 89,915 hands and produce 2,817,206 cwt. of yarn representing a consumption of 3,401,569 cwt. of cotton, or 972,731 bales. The total arrivals of cotton in Bombay amounted to 7,530,087 cwt.; and 3,107,588 cwt. were exported. There are in Bombay Island 79 mills with a total of 2,531,230 spindles and 24,136 looms, or nearly half the aggregate number of spindles in India, and more than half the total number of looms in the country.

SALT INDUSTRY, LIAOTUNG.—Mr. Oku, of the Japanese Department of Agriculture and Commerce, reports that the western coast of Liaotung from Fuchow to Kaiping might be made a vast salt-field and salt be produced there at the cost of not more than 15 *sen* per *koku*, owing to the cheapness of labor. As compared with Formosa, Liaotung will prove the more profitable ground for salt producers, and an ample market can be found in Korea and Manchuria. No one has yet engaged in this business there, which is likely to become one of the most promising enterprises for any large capitalists.

COAL CONTRACT, PHILIPPINES GOVERNMENT.—Messrs Henry W. Peabody & Co. have received the contract to furnish the Insular Government of the Philippine Islands 40,000 tons of coal between June 30th, 1905, and July 1st, 1906. Only one other firm competed for the contract, Messrs. Macondray & Co. of Manila The accepted tender per ton, delivered and piled in the various yards of the Government, was as follows: "West Wallsend," -P-10.53; "Lambton," -P-10.53; "Seaham," -P-10.37; "Pacific," -P-9.63, for Manila. For the ports of Iloilo, Cebú, Zamboanga, Jolo, Tacloban and Romblon, "West Wallsend" and "Lambton," -P-11.27; "Seaham," -P-10.37.

RUBEROID.—This roofing material, now becoming so well and favorably known in India, is fast coming into more general use for covering all classes of buildings in Far Eastern countries, including China, Japan, and the Philippine Islands. For use in tropical climates it is said to have no equal. While it is said to be an ideal roofing for cheap outbuildings and stables it is the most durable and most economical roof that can be put on the finest residences. It can be painted in any color for decorative purposes. Ants and various other destructive insects, with which most of the tropical countries are infested, will not attack Ruberoid.—*Indian Engineering.*

STEAM PLOUGHING, SIAM.—Dr. Adamsen has ploughed his paddy fields near Klong Rangsit with an American plough driven by a coal-oil engine of two horse power, and we understand the experiment has been a success. He has been doing this in the midst of the dry season when the ground is very hard. It is believed that this is the first time that any power but that of buffaloes has been used in this country and the experiment is being watched very closely by the large growers of rice. Additional machinery is now on the way from America including disc harrows and 10 h. p. coal-oil engines. These engines, it is said, can be run at a cost for fuel of four ticals per day. It is estimated that four men with this plant using a 10 h. p. oil engine can do the work of 30 buffaloes and 30 men —*The Bangkok Times.*

FINANCIAL NEWS

CALCUTTA TRAMWAYS.—The Calcutta Tramways are paying a dividend for last year of 8 per cent after having made provision for consolidating, improving, and extending the existing system, and after bringing the depreciation fund up to £42,000.

BURMA OIL COMPANY.—The Directors of the Burma Oil Company propose that the capital be increased from £1,000,000 to £2,500,000 by the creation of 75,000 6 per cent second cumulative preference shares of £10 each, and 250,000 ordinary shares of £1 each.

FIFTH JAPANESE DOMESTIC LOAN.—The total subscriptions from local banks to the fifth Japanese domestic loan already amounts to over -Y-63,000,000. In addition the Imperial Household has subscribed -Y-20,000,000, the Nippon Yusen Kaisha -Y-1,000,000, the insurance companies about -Y-20,000,000, Princes Shimaz and Mori and Marquis Mayeda -Y-1,000,000 each, so that the total of the subscriptions already fixed more than covers the issued amount.

A. S. WATSON & CO., LTD., HONGKONG.—At the twentieth annual ordinary general meeting of this company, held May 27th, the Chairman, Mr. H. Humphreys, showed a most healthy condition of business During the period under review the capital of the concern was increased from $600,000 to $900,000 by the issue of 30,000 new shares at $10 each, such shares being issued at 10 per cent premium The reserve fund now amounts to $300,000.

TAOKOU-CHINGHUA RAILWAY, CHINA.—The agreement by which the Peking Syndicate sells this line to the Chinese Government, has been signed Payment will be made in 5 per cent Imperial Chinese Government bonds, the Syndicate to work the line for account of the Government, retaining a share, amounting to 20 per cent, in the profits. The price is said to be about £700,000, which represents the total outlay, with interest, of the Syndicate on the line, 90 miles in length, which connects the Syndicate's mines in Honan with the main line of the Peking-Hankow Railway.

COLD STORAGE & ICE TRADE JOURNAL

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¶THE LEADING NEWS AND TECHNICAL MAGAZINE OF THE REFRIGERATING, ICE MAKING, NATURAL ICE AND ALLIED TRADES.

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FAR EASTERN STOCKS AND QUOTATIONS

COURTESY OF BENJAMIN, KELLY & POTTS, SHAREBROKERS, HONGKONG-MANILA, 9th June, 1905.

STOCKS	WHEN ESTABLISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation* PER CENT	CLOSING QUOTATIONS
Banks.												
Hongkong and Shanghai Banking Corporation	1865	$10,000,000	80,000	$125	$125	g £1,000,000 s $8,000,000 i $250,000	$1,493,408	31-12-04	£1.10/. and bonus £1 @ exchange 1/11 9-16=$25.46 for second half-year 1904	20-2-05	5¼%	$800 sellers London £82
National Bank of China, Limited	1891	£699,475	99,925	£7	£5	$200,000	$41,768	31-12-04	$2 (London 3/6) for 1903	1-2-04	—	$37 buyers
Marine Insurances.												
Canton Insurance Office, Limited	1881	$2,500,000	10,000	$250	$50	$1,400,000 j $81,739	$150,494	31-12-03	$17 for 1903	22-10-04	5¼%	$325 sellers
China Traders' Insurance Co., Ld.	1865	$2,000,000	24,000	$83.33	$25	$950,000 f $151,992 j $362,366 u $371,445	Nil.	30-4-04	$4½ for year ended 30-4-1904	8-12-04	6¾%	$64 buyers
North China Insurance Co., Ld.	1863	£150,000	10,000	£15	£5	T800,000	T217,119	30-6-04	Interim of 7/6 for 1905	1-5-05	8%	T82
Union Insurance Society of Canton, Limited	1867	$2,500,000	10,000	$250	$100	s $1,850,000 g £20,000 f $372,749 j $893,110 u $846,773	$2,078,997	30-6-04	$35 for 1903	21-1[illegible]-04	5%	$695 sellers
Yangtsze Insurance Association, Ld.	1862	$800,000	8,000	$100	$60	$750,000 j $50,000 f $5,890	$599,364	31-12-04	$12 and $3 special dividend for 03	12-4-05	9¼%	$160
Fire Insurances.												
China Fire Insurance Co., Ld.	1870	$2,000,000	20,000	$100	$20	$1,000,000 x $218,039 f $2,241	$260,374	31-12-04	$6 dividend and $1 bonus for 1903	10-3-05	8¼%	$87 sales
Hongkong Fire Insurance Co., Ld.	1868	$2,000,000	8,000	$250	$50	$1,200,505	$360,372	31-12-04	$34 for 1903	7-3-05	11¼%	$300 sales
Shipping, Tug and Cargo Boats.												
China and Manila Steamship Co., Ld.	1882	$750,000	(1) 30,000	$25	$25	$5,000	$8,832	31-12-04	$1 for 1904	27-3-05	4¾%	$21½ sellers
Douglas Steamship Co., Ld.	1883	$1,000,000	20,000	$50	$50	$185,000 i $85,439	Nil.	30-6-04	$2 for year ended 30-6-1904	29-9-04	5¾%	$36 buyers
Hongkong, Canton and Macao Steamboat Company, Ld.	1865	1,200,000	80,000	$15	$15	e $250,000 d $600,000 f $158,444	$26,160	31-12-04	$1 for second half-year 1904	15-2-05	9½%	$27 sales
Indo-China Steam Navigation Company, Ld.	1882	£1,200,000	(2) 60,000	£10	£10	£100,000 i £205,000	£5,853	31-12-03	10/. @ 1/10 5-16=$5.37.82 for 1903	13-7-04	4½%	$106 sellers
Shanghai Tug and Lighter Co., Ld. Do. Preference.	1903	T1,500,000	200,000 100,000	T50	T50	i T25,000	T43,762	31-12-04	Final of Tls 2½ making Tls. 4½ / Tls. 1½ making Tls. 3½ for '04	1-3-05	7½% 7½%	T60 sellers T48 buyers
"Shell" Transport & Trading Co., Ld.	1898	£2,000,000	2,000,000	£1	£1	£400,000 i £4,116	£58,852	31-12-03	Interim of 1/. (Coupon No. 5) for '04	1-1-05	4½%	23/.
"Star" Ferry Co., Ld.	1898 1900	$200,000	10,000 10,000	$10 $10	$10 $5	$65,000 i $24,257	$929	30-4-05	$1.80 / $0.90 cents for year ended 30-4-05	29-5-05	5¼% 3¾%	$35 $27
Straits Steamship Co., Ld.	1890	$500,000	(3) 5,000	$100	$100	$400,000 e $21,075 i $230,153	$21,231	31-12-04	$10 for 1904	12-3-05	8%	$130 buyers
Taku Tug and Lighter Co., Ld.	—	T. T1,500,000	30,000	T. T50	T. T50	e T102,000 d T212,614	T6,190	31-12-04	T1¾ final making T3¼ for 1904	29-2-05	11%	T30 sales
Refineries												
China Sugar Refining Company, Ld.	1878	$2,000,000	20,000	$100	$100	e $450,000	$42,812	31-12-04	Final of $15 making $20 for 1904	24-3-05	9¼%	$218 sellers
Luzon Sugar Refining Company, Ld.	1882	$700,000	7,000	$100	$100	none	Dr. $85,987	31-12-04	$3 for 1897	24-3-98	—	$33 sales
Perak Sugar Cultivation Co., Ld.	—	T350,000	7,000	T50	T50	T100,000	T1,635	30-9-04	12½ for year ending 30-9-04	17-12-04	3¾%	T71
Mining.												
Chinese Engin'ring and Mining Co., Ld.	1901	£1,000,000	1,000,000	£1	£1	q £40,000	£7,820	29-2-04	No. 3 of ⅙	15-9-04	—	T7.½ sellers
Oriental Consolidated Mining Co., Ld.	1901	G.$5,000,000	z 500,000	G. $10	G. $10	none	G. $672,093	31-12-04	Final of 50 cents making G.$1 for '04	30-12-04	5¾%	G. $17½
Raub Australian Gold Mining Co., Ld.	1892	£200,000	150,000 50,000	£1 £1	18/10 £1	£4,873	Dr. £4,029	31-3-04	No. 12 of 1/.=48 cents	28-1-01	—	$3½ sales
Société Francaise des Charbonnages du Tonkin	1888	F.4,000,000	16,000	F.250	F.250	l F307,740 a F1,529,652	F.87,333	31-12-03	Final of F.25, making F. 50 for 1903.	1-9-04	—	$490

STOCKS	WHEN ESTABLISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation PER CENT	CLOSING QUOTATIONS
Docks, Wharves and Godowns.												
Geo. Fenwick and Co., Ld.	1889	$150,000	6,000	$25	$25	$70,000	$8,577	31-12-04	$3¼ for 1904	13-3-05	11¼%	$33½
Hongkong and Kowloon Wharf and Godown Co., Ld.	1886	$2,000,000	40,000	$50	$50	$250,000; q $58,423; i $10,000; y $300,000	$29,422	31-12-04	Final of $2½ making $5 for 1904	11-3-05	4¾%	$103 sellers
Hongkong & Whampoa Dock Co., Ld.	1901	$2,500,000	50,000	$50	$50	i $33,500	$498,289	31-12-04	$6 div. & $1 bonus for 2nd ½ year '04	21-2-05	6½%	$200 sellers
Howarth Erskine, Ld.	1901	$1,200,000	12,000	$100	$100	$60,000	—	30-6-04	$10 div. & $5 bonus for the year	8 04	5½%	$270 buyers
New Amoy Dock Co., Ld.	1892	$40,500	6,000	$6¾	$6¾	$55,500	$489	31-12-03	$1¼ for '03	5-5-04	6 %	$19 sellers
Riley Hargreaves & Co., Ld.	1899	$875,000	6,000	$100	$100	$150,000	$40,936	31-12-03	$10 div. and $2½ bonus for '03	7-3-04	5 %	$250 sellers
Do. (Preference)			2,750						$7 dividend for '03		6¼%	$111½
S. C. Farnham, Boyd & Co., Ld.	1901	T5,520,000	55,200	T100	T100	T900,000	T48,153	30-4-04	Interim of T5 account '04-05	6-1-05	8 %	T160
Shanghai and Hongkew Wharf Co.	1902	T3,200,000	32,000	T100	T100	b T487,210; r T59,880	T10,711	31-12-04	Final of T6 making T10 for '04	30-3-05	5¼%	T187½ buyers
Tanjong Pagar Dock Co., Ld.	1864	$3,700,000	37,000	$100	$100	$2,100,000	$206,645	31-12-04	$20 for second ½ year making $26 for '04	20-3-05	6½%	$395
Yangtsze Wharf and Godown Co., Ld.	1902	T250,000	2,500	T100	T100	T17,500	T2,762	31-12-05	T18 for '04	29-3-05	9¾%	T190
Lands, Hotels and Buildings.												
Astor House Hotel Co., Ld. (Shanghai)	1901	$750,000	(4) 30,000	$25	$25	none	$9,989	30-6-04	$2½ for year ending 30-6-04	30-8-04	7¼%	$33 sales
Astor House Hotel, Ld. (Tientsin)	—	T. T100,000	2,000	T. T50	T. T50	T34,000; e T8,000	T806	29-2-05	Final of T5 making T9 for the year	20-4-05	6½%	T140 sellers
Central Stores, Ld.	—	$91,845	6,000	$15	$12	$20,000	$1,502	31-12-04	Final of 60 cents making $1.80 for '04	30-3-05	8¾%	$21 sellers
Do. (Founders')			123	$15	$12				None	—	—	$100
Do. (New Issue)	1904	$360,000	24,000	$15	$7½				Preferential of 7% for '04	30-3-05	6¾%	$8 sellers
Hongkong Hotel Co., Ld.	1866	$600,000	12,000	$50	$50	$100,000; r $10,000	$3,554	31-12-04	$5 for 2nd half-year making $10 for '04	30-3-05	7 %	$145 sellers
Hongkong Land Investment and Agency Co., Ld.	1889	$5,000,000	50,000	$100	$100	e $250,000	$37,875	31-12-04	Final of $6 making $12 for '04	31-1-05	10 %	$122 sellers
Hotel des Colonies Co., Ld. (Shanghai)	1902	T225,000	9,000	T25	T25	n T20,986	T7,202	31-3-05	T2½ for the year ending 31-3-05	18-5-05	14 %	T17½ sales
Humphreys' Estate & Finance Co., Ld.	1887	$1,500,000	150,000	$10	$10	i $200,994; e $50,000	$11,958	31-12-04	90 cents for '04	11-2-05	7 %	$13 sales
Kowloon Land and Building Co., Ld.	1889	$300,000	6,000	$50	$30	none	$377	31-12-04	$3 for '04	31-1-05	7½%	$40 sellers
Shanghai Land Investment Co., Ld.	1901	T2,600,000	52,000	T50	T50	T828,813; e T170,000	T40,066	31-12-04	T3 final & T2 bonus making T8 for '04	16-2-05	6¾%	T120 buyers
Tientsin Hotel des Colonies, Ld.	1903	T70,000	1,400	T50	T50	none	T670	31-12-04	T5 for '04	1-3-05	10½%	T47 sellers
Tientsin Land Investment Co., Ld.	1902	T772,600	7,726	T100	T100	i T67,300	T725	31-12-04	T4 final making T7 for '04	29-2-05	5½%	T125 sellers
Wei-hai-wei Land and Building Co., Ld.	1899	T91,850	3,764	T25	T25	none	T687	31-12-04	None	—	—	T12 buyers
West Point Building Co., Ld.	1889	$625,000	12,500	$50	$50	none	$1,247	31-12-04	Final of $1.70 making $3.20 for '04	31-1-05	5½%	$55 sellers
Cotton Mills.												
Ewo Cotton Spinning and Weaving Co., Ld.	1895	T750,000	15,000	T50	T50	none	T12,844	31-10-04	T4 for year ended 31-10-03	22-12-03	11½%	T35 buyers
Hongkong Cotton Spinning, Weaving and Dyeing Co., Ld.	1901	$1,250,000	125,000	$10	$10	none	$22,862	31-7-04	50 cents for year ended 31-7-04	12-9-04	3 %	$16½ sellers
International Cotton Manufacturing Co., Ld.	1895	T750,000	(5) 10,000	T75	T75	T50,000	T13,629	30-9-04	Interim of 3% a/c 1898	30-4-98	—	T36 sales
Laou-kung-mow Cotton Spinning & Weaving Co., Ld.	1895	T800,000	(6) 8,000	T100	T100	none	T10 000	31-12-04	Interim of 4% a/c 1898 on 6,000 shares	1-8-98	—	T39 sales
Soy Chee Cotton Spinning Co., Ld.	1895	T1,000,000	2,000	T500	T500	l T5,658	T22,051	31-12-04	4% for 1897	2-2-01	—	T180
Cigar and Tobacco Cos.												
Alhambra, Limited	1898	$60,000	300	$200	$200	none	Dr. $2,584	31-12-04	$125 for year ending 30-6-1900	15-8-01	—	$100
Philippine Company, Limited	1904	$675,000	67,500	$10	$10	—	—	—	First year	—	—	$9½ sellers
Shanghai-Sumatra Tobacco Co., Ld.	1902	T600,000	(7) 30,000	T20	T20	T24,820; v T25,000	T1,297	31-10-04	Final of T6 making T9	8-3-05	13 %	T70 sales
Miscellaneous.												
Anglo German Brewing Co., Ltd.	1905	$400,000	4,000	$100	$100	—	—	—	First year.	—	—	$125 sellers
Bell's Asbestos Eastern Agency, Ld.	1895	£5,377.10s	8,604	12/6	12/6	none	£161	31-12-04	6d. per share for '03	21-7-04	5 %	$5½ buyers
Campbell, Moore & Co., Ld.	1886	$12,000	1,200	$10	$10	$8,000	$1,182	31-12-04	$3 for 1904	1-4-05	8¼%	$36
China-Borneo Co., Ld.	1903	$720,000	(8) 60,000	$12	$12	none	—	31-12-04	$1 for 1904	17-3-05	7¾%	$12½ sellers
China Flour Mill Co., Ld.	—	T200,000	4,000	T50	T50	T30,000	T718	31-12-04	T5 for 1904	24-3-05	8¼%	T60 sales
China Light and Power Co., Ld.	1901	$300,000	30,000	$10	$10	none	$3,739	29-2-04	None	—	—	$10
China Provident Loan and Mortgage Co., Ld.	1898	p $1,000,000	100,000	$10	$10	$80,000	$1,581	31-12-04	80 cents for 1904	18-1-05	9¼%	$8¾
Dairy Farm Company, Ld.	1896	$187,500	25,000	$7¼	$6	—	—	31-7-04	$1½ for year ending 31-7-03	20-11-03	—	$17 sellers

STOCKS	WHEN ESTABLISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation* PER CENT	CLOSING QUOTATIONS
Miscellaneous.—Continued												
Fraser & Neave, Ld.	1898	$225.000	4,500	$50	$50	$112,500	$2,706	31-12-03	$5 dividend and $2½ bonus for '03	26-3-04	8 %	$96½ buyers
Green Island Cement Co., Ld	1889	$1,000,000	100,000	$10	$10	y $400,000	$95,054	31-12-04	$2 for 1904	27-2-05	7½%	$26½ sales
Do (New issue)	1905	$500,000	50,000	$10	$5	$250,000			First year	—	—	$16½
Hall & Holtz, Ld.	—	$420,000	(9) 21,000	$20	$20	$186,000	$7,551	29-2-05*	Final of $1½ making $2½	15-4-05	9¼%	$27 buyers
Hongkong and China Gas Co., Ld.	1864	£70,000	7,000	£10	£10	f £23,109 / £3,000	£7,625	31-12-03	Final of 6% & bonus of 1% making 22s. for 1903	25-5-04	7½%	$160 buyers
Hongkong Electric Co., Ld.	1889 / 1899	$600,000	30,000 / 30,000	$10 / $10	$10 / $5	none	$1,747	30-4-04	$1.00 / 50 cents for year ending 30-4-04	18-7-04	5¾% / 4½%	$17¾ / $11½ buyers
Hongkong High-Level Tramways Co., Ld.	1887	$125,000	1,250	$100	$100	$50,000	$2,796	30-11-04	$15 for year ending 30-11-04	24-12-04	7½%	$200
Hongkong Ice Company, Ld.	1881	$125,000	5,000	$25	$25	k $60,000	$5,356	31-12-04	Final of $13 making $17 for 1904	14-2-05	7 %	$242½
H'kong Rope Manufacturing Co., Ld.	1883	$500,000	10,000	$50	$50	$60,000	$11,137	31-12-04	$10 for 1904	10-4-05	7 %	$152 buyers
Hongkong Steam Waterboat Co., Ld.	1900	$150,000	15,000	$10	$10	$2,500	$299	30-9-04	Interim of 50 cents for half year ended 31-3-1905	3-6-05	11¼%	$17
Katz Brothers, Ld.	1896	$1,000,000	10,000	$100	$100	$475,000	$3,400	31-12-04	$8 for 1904	...-3-05	6 %	$135 buyers
Lane, Crawford & Co., Ld. (Shanghai)	1903	$250,000	2,500	$100	$100	none	$21,582	29-2-04	Interim of $5	19-11-04	7¼%	$145 sales
Maatschappij tot Mijn-, Bosch- en Landbouwexploitatie in Langkat	1902	G.2,500,000	25,000	G.100	G.100	i T528,210 / T19,465	T35,849	31-10-04	First quarterly dividend of T7½ for '05	15-3 05	15 %	T227½ sellers
Maynard & Co., Ld	1901	$34,000	3,400	$10	$10	none	—	31-10-04	$2 for year ended 31-10-04	3-12-04	9 %	$23
Mondon, (E. L.) Ld	1902	T350,000	7,000	T50	T50	none	Dr. T117,638	31-12-04	T5 for 1902	2-5-03	—	T25 sales
S. Moutrie & Company, Limited	1899	$200 000	4,000	$50	$50	$5,000	$832	30-6-04	Final of $3 making $5 for year ending 30-6-04	28-12-04	9 %	$54 sales
Shanghai and Hongkong Dyeing and Cleaning Co., Ld.	1903	$60,000	1,200	$50	$ 50	none	Dr. $5,537	31-8-04	None	—	—	$50
Shanghai Gas Co., Ld.	1903	T800,000	16,000	T50	T50	q T145,000 / T108,172	T8,011	31-12-04	T3½ final and T1½ bonus making T8½ for '04	8-3-05	7 %	T125 sales
Shanghai Horse Bazaar Co., Ld.	1904	T270,000	5,400	T50	T50	T45,000	T10,247	31-12-03	T5 for 1903	8-4-04	6 %	T82½ sales
Shanghai Pulp and Paper Co., Ld.	—	T450,000	4,500	T100	T100	T25,000	T6,968	31-12-04	Final of T8 making T14 for '04	28-2-05	8½%	T160 sales
Shanghai Waterworks Co., Ld.	1881	£144,000	7,200	£20	£20	T170,000	T17,220	31-12-04	Final of 37/6 making 52/6 for '04	6-4-04	4¼%	T450 buyers
Singapore Dispensary, Ld	1891	$30,000	600	$50	$50	$20,000	$1,769	31-7-04	$6¼ for year ended 31-7-04	19-9-04	7¾%	$80
South China Morning Post, Ld.	1903	$150,000	6,000	$25	$25	none	Dr. $39,020	29-2-04	None	—	—	$25
Steam Laundry Co., Ld.	1902	$75,000	5,000 / 10,000	$5 / $5	$5 / $5	none	$3,644	31-5-04	60 cents for year ended 31-5-04 / First year	2-8-04 / —	7¾% / —	$8 buyers / $7½ buyers
Straits Ice Company, Ld.	1884	$200,000	2,000	$100	$100	$25,000	$700	31-12-04	$10 for second half year '04	...-2-05	13¼%	$150 buyers
Straits Trading Co., Ld.	1887	$2,500,000	250,000	$10	$10	e $750,000 / $50,000	$84,813	30-9-04	$1 dividend and 35 cents bonus for half year ended 31-9-04	9-12-04	6½%	$42¾ buyers
Tientsin Native City Waterworks Co., Ld.	1902	T356,000	3,560	T100	T100	none	T2,025	31-12-04	T2 for 2nd half year '03	9-3-04	—	T. T100
Tientsin Waterworks Co., Ld.	1901	T. T200,000	2,000	T. T100	T. T100	T15,259	T2,211	30-4-04	Final of T4 making T8 for '03/4	20-6-04	6¼%	T. T125
United Asbestos Oriental Agency, Ld. / Do. do. (Founders')	1896	$100,000	9,900 / 100	$10 / $10	$4 / $10	$20,000	$480	31-5-04	90 cents / $29.70 for year ended 31-5-04	6-8-04	9¼% / 16¾%	$9½ buyers / $180 buyers
Watson (A. S.) & Co., Ld.	1886	$900,000	90,000	$10	$10	e $300,000 / $25 000	$6,096	31-12-04	Final of 50 cents making $1 for '04	29.5-04	8 %	$12¾
William Powell, Ld.	1901	$120,000	12,000	$10	$10	e $3,000	$588	30-6-04	Interim of 50 cents for year 1094/5	10-4-05	10½%	$11¼

LOANS AND DEBENTURES	AGENTS FOR THE LOAN	AMOUNT OF LOAN	PAR VALUE	OUTSTAND'G BONDS	WHEN PAYABLE.	CLOSING QUOTATIONS
Chinese Government, 7 per cent. Silver Loan 1886 E.	Hongkong Shanghai Bk. Cor.	T767,200	T250	1969	Mar. 31st & Sept. 30th each year until Mar. 31st, 1917.	par.
Hongkong Hotel Co., Ltd., 6% Mortgage Debentures of 1899‡	Hongkong Shanghai Bk. Cor.	$500,000	$500	§ all	Half yearly, June 30th and December 31st	par. Plus accrued interest
Shanghai & Hongkew Wharf Company Ltd. 6% Debentures of 1902	Hongkong Shanghai Bk. Cor.	T543,900	T100		Half yearly, June 30th and December 31st	T96 Plus accrued interest
Astor House Hotel Co. Ltd. 8% Debentures of 1903	Hongkong Shanghai Bk. Cor.	T500,000	T100		Half yearly, January 1st and July 1st	T105 Plus accrued interest
Chinese Engineering & Mining Co., Ltd., 6 per cent Debentures of 1902†		£500,000	¶	£480,000	Half yearly, June 30th and December 31st	par. Plus accrued interest
International Cotton Manufacturing Co. Ltd. 6% Debentures of 1901	Russo Chin. B.	T500,000	T100		Half yearly, March 31st and September 30th	par. Plus accrued interest

a Amortisation Fund.
b Building Reserve Account.
c Capital Reserve Fund.
d Depreciation and Insurance Fund.
e Equalization of Dividend Fund.
f Exchange and Investment Fluctuation Account.
g Gold Reserve Fund
h Exchange Reserve Account.
i Insurance Fund.
j Reinsurance Fund.
k Contingencies Account
l Legal Reserve Fund.
m
n Sinking Fund.
o
p Authorized capital $2,000,000.
q Depreciation and Repair Fund.
r Repairs and Renewals Account.
s Silver Reserve Fund.
t
u Underwriting Suspense Account.
v Special Works Fund.
w
x Extra Reserve Fund.
y Premium on New Issue.
z 75,000 owned by the Company.
1 5,725 shares unissued.
2 First issue of 60,000 of which 10,411 unallotted.
3 785 shares unissued.
4 7,600 shares unissued.
5 1,616 shares unallotted.
6 842 shares unallotted.
7 Only 13,000 shares issued.
8 14,000 shares unissued.
9 399 shares unissued.
* Based on last year's dividend.
§ 270 held by the Company.
¶ In certificates of £20 and £100
‡ Redeemable in 10 years, or at option of Company the Company giving 6 months' notice.
† Redeemable at par at rate of £10,000 per annum from 31st December, 1903, to 31st December, 1952.
Dr. Deficit.

SINGAPORE SHARE QUOTATIONS.

Courtesy Messrs. Fraser & Co. Brokers, Singapore, June, 1905.

NAME	DATE OF FOR-MATION	CAPITAL	CAPITAL PAID UP	NO. OF SHARES	ISSUE VALUE	PAID UP	RESERVE	LAST DIVIDEND	SINCE LAST MAIL HIGHEST	SINCE LAST MAIL LOWEST	CLOSING QUOTATIONS
Mining.									$	$	$
Bersawah Gold Mining Co., Ld.	1900	$175,000	115,000	13,500 *1*	10	7.50					13.00 sellers
" " " " *Deferred*				4,000	10	10					8.00 sellers
Bruseh Hydraulic Tin Mining Co., Ld.	1901	600,000	600,000	60,000	10	10					4.00 buyers
Kadana Gold Mining Co., Ld.	1901	300,000	220,000	20,000	10	10					10.00 nominal
" " " " *Pref.*				10,000	10	8					8.00 "
Kechau Goldfields, Ld. *Fully paid*	1902	£30,000	£16,175	6,207	1	1					8.00 sellers
" " " *Contrib.*				10,493 *2*	1	19/-					7.50 sellers
Pahang Corporation Ld.	1889	£250,000	244,306	244,306	1	1	20,000	3 per cent for year ending 30 6-02			4.35 sales
Pahang Kabang Ld.	1890	375,000	366,000	360,000	1	1			1.05	0.95	0.95 sellers
" " " *Pref.*				15,000	1	1					...... nom.
Queensland Raub G. M. Co., Ld. *Fully paid*	1901	£146,700	100,866	36,700	1	1					...... nom.
" " " " " *Contrib*				110,000	1	11/8					0.30 sellers
Raub Aust. Gold Ming. Co., Ld. *Fully paid*	1892	200,000	191,250	50,000	1	1	4,873	1s. paid January, '01			4.25 sellers
" " " " *Contrib.*				150,000	1	18/10		1s. " " "	4.00	3.90	4.00 buyers
Redjang Lebong Mining Co.	1898	£2,000,000	1,800,000	20,000 *3*	100	100		22 9-10% for year ending 31-12-04	252.50	245.00	245.00 sales
Royal Johore Tin Mining Co., Ld.	1900	$220,000	220,000	22,000	10	10		5 " for year ending 15-2-04			3.00 sales
Sipiau Tin Co., Ld.	1899	230,000	230,000	23,000	10	10		5 " for ½ year ending 30-6-03	4.25	4 00	4.25 buyers
South Raub Gold Ming. Synd. Ld.	1898	100,000	100,000	1,000	100	100					10.00 nom.
The Belat Tin Mining Co., Ld.	1903	300,000	300,000	30,000	10	10					7.00 sellers
Tronoh Mines, Ld.	1902	£160,000	149,185	160,000 *5*	1	1		1s. paid April '05			21.00 sellers
Duff Development Co., Ld.	1903	£400,000	£350,000	400,000 *6*	1	1					10.50 sales
Rubber.											
Bukit Rajah Rubber Co.		£70,000	£61,000	70,000	1						£2.12s 6d.
Cicely Rubber Estates Co.		£6,000	£6,000	6,000	1						£1. 2s. 0d.
" " " 5% Pref.		£6,000	£4 500	6,000	1						£1. 7s. 6d.
Pataling Rubber Estate Syndicate	1903	£30,000	£17,500	30,000	1	1		Mortgage £5,000			£2.10s.
Ribu Planting Co. Ld.	1904	200,000	135,000	2,000	100	100					150.00
Selangor Rubber Co. Ltd.	1898	£30,000	£26,000	26,000	1	1					£5. 5s.
Singapore & Johore Rubber Co. Ld.	1903	100,000	70,250	150	100	100					100.00
				850	100	65					
Sungei Way Rubber Co.	1904	£50,000	£13 920	50,000	1	4/-					£1
Vallambrosa Rubber Co.		£60,000	£50,000	60,000	1						£2.10
General.											
Fraser & Neave, Ld.	1898	225,000	225,000	4,500	50	50	112,500	10 p. ct. and 2½ per cent bonus for '04	99.00	97.00	99.00 sales
Hogan & Co., Ld.	1904	480,200	334,800	3,348	100	100	5,000	7 per cent March 1905			85.00 sellers
H'kong and Shanghai Banking Corporation	1865	10,000,000	10,000,000	80,000	125	125	10,000,000 *9* 6,500,000 250,000 *10*	30s. div. and 10s. bonus at 1-11-9-16 =$25.46.42 per share for ½ year ending 31-12-04			720.00 buyers
Howarth Erskine, Ld.	1901	1,200,000	1,200,000	12,000	100	100	140,000	10 & 5 p. ct. bon. for yr. end 30-6-04			270.00 buyers
Maynard & Co., Ld.	1901	34,000	34,000	3,400	10	10		20 per cent for year ending 31-10-04			23.00 sellers
Riley, Hargreaves & Co., Ld.	1899	875,000	875,000	6,000	100	100	150,000	10 p. ct. and 2½ p. ct. bon. for year '04	250.00	250 00	245.00 sales
" " " 7% Pref.				2,750	100	100		7 p. ct. for year 1904			115.00 buyers
Singapore Cold Storage Co., Ltd.	1903	600,000	240,000	25,000	10	10					8.50 sellers
Singapore Dispensary Ld.	1891	30,000	30,000	600	50	50	19,000	12½ per cent for year ending 31-7-04			75.00 buyers
Straits Ice Co., Ld.	1884	200,000	200 000	2,000	100	100	22,000	5 " interim for 1905			150.00 buyers
Straits Steam Ship Co., Ld.	1890	500,000	421,500	5,000 *7*	100	100	400,000 169,228 *11*	10 p. ct. per year ending 31-12-0.4		127.00	135.00 buyers
Straits Trading Co., Ld.	1887	3,000,000	2,500,000	300,000 *8*	10	10	700,000 1,021,395 *12*	10 p. ct. & 35 cts. bon. ½ yr. end 31-9-04		42.50	43.00 sales
Tanjong Pagar Dock Co., Ld.	1864	3,700,000	3,700,000	37,000	100	100	1,950,000	$20 for half year ending 31-12-04			395.00 ......
Debentures.											
Howarth Erskine Ld. 7 per cent ... 250,000											3 per cent prem.
Singapore Municipal 6 " ... 400,000											... " nominal
" " 5 " ...1,878,000											1 " prem. buyers
" " 4 " ... 655,500											2 " dis. nominal
Riley Hargreaves & Co., Ld. 6 p. cent 225,000											2 " prem. buyers
Tanjong Pagar Dock Co., Ld. 6 " 250,000											2 " prem. sales
" " " " 5 " 1,365,500											1 " prem.

1 3,500 unissued.
2 13,300 "
3 2,000 unissued.
4 35,000 "
5 10,815 unissued.
6 50,000 "
7 785 unissued.
8 50,000 ".
9 Special Gold Reserve Fund.
10 Insurance Fund.
11 Sundry Reserves.
12 Sundry Reserves.

FRASER & CO., Sharebrokers.

LUNETA EXTENSION, MANILA

The Atlantic, Gulf and Pacific Company has agreed with the Philippine Commission to fill in the projected Luneta extension and other parts of Manila Harbor, for 12 cents per cubic yard. This is a reduction of 10 cents per cubic yard from the price formerly asked by the company. The old south wall, or breakwater, which forms the boundary of the reclaimed area of the harbor will be extended by an additional 1000 ft. and this wall and its extension will form the south side of the big pier which the Government intends to build there. It is expected that by this extension a saving of about 40 per cent will be effected in the wharf construction of the harbor. The pier will be long enough and the harbor deep enongh there for two large vessels on the inside and one on the outside.

TO THE PUBLIC

The new Electric Light Company will soon be furnishing current for lighting and power, and before many months the new current will be in use all over Manila, therefore those who are now using "La Electricista" service will have to make the necessary change in their present installation in order to use the new system.

We are prepared NOW to make such changes. ALL the material used by us at this time is of a type and class that will be accepted by the City Inspector and the new Company, for permanent use. In making such changes, give us a chance to figure on your work.

DO YOU OWN FANS? If so, they will have to be changed so that you can use them on the new service. NOTE THE NAME ON YOUR FAN. If it is "GENERAL ELECTRIC" we will change it for you at a cost not to exceed -P-12 conant.

We also carry a full line of electrical goods, and can make prompt importations of any that you may want, if we do not have them in stock. GIVE US A TRIAL ORDER.

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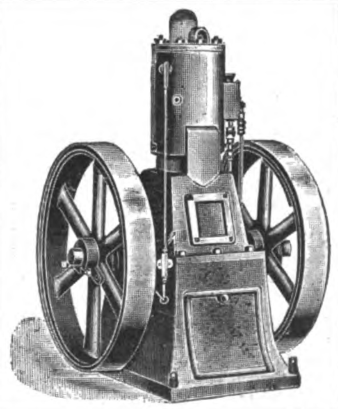

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FAR EASTERN REVIEW

COMMERCE ❂ ENGINEERING ❂ FINANCE

VOL. II. MANILA, P. I., JULY, 1905. No. 2.

NEW GOVERNMENT OFFICES OF HONGKONG COLONY

(Messrs. Denison, Ram & Gibbs, Architects.)

The construction of the new Government Offices at Hongkong is now well under way, and from the illustrations which THE FAR EASTERN REVIEW is privileged to furnish of the buildings it can readily be seen that this enterprising British Colony on the other side of the North China Sea will soon be able to boast of as fine official buildings as can be found anywhere in the Orient.

According to the *South China Morning Post,* for a long time past the Postal Department has been sadly hampered by the limited accommodations at the Queen's-rd and Pedder-st premises, but now that the erection of a new Post Office and Government Offices is well under way the people of the colony must be content with present arrangements and look to the future.

The site adopted for the new Offices is on the reclamation opposite Blake Pier and adjoining the offices of the *South China Morning Post*. The erection of these commodious Offices will complete the reclamation in this part of the town, and a really fine series of buildings on the waterfront will be greatly enchanced when the Government Offices are finished. From the premises an excellent unrestricted view of Hongkong Harbor will be obtained, and the mails will be landed practically at the post office door.

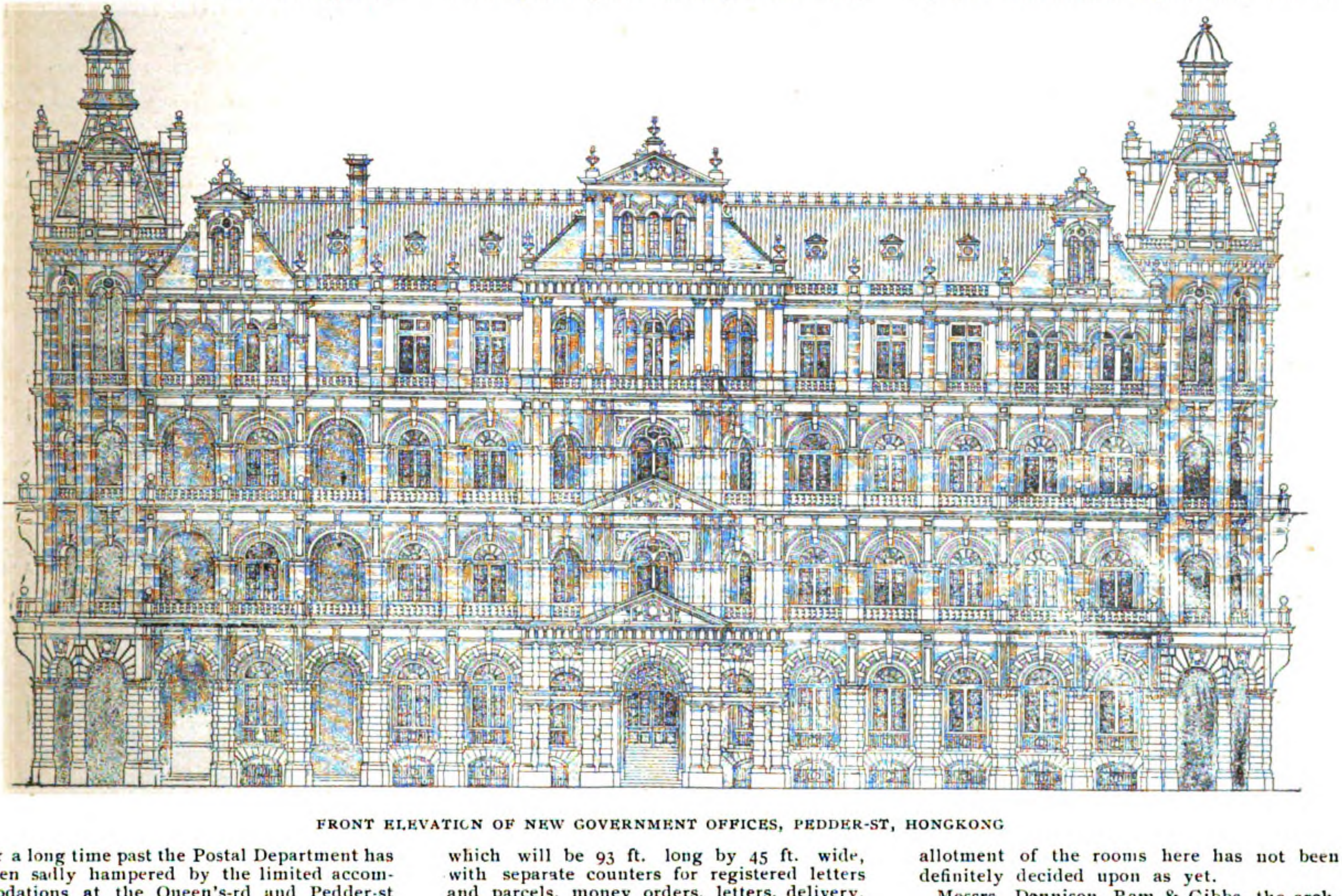
The block of buildings will be styled "Government Offices." The foundation and superstructure are rapidly assuming proportions, and from now on the buildings will grow into handsome proportions. The premises will face Pedder-st. The entrance forms the central figure of this front and will give access to the general public to the post office hall, which will be 93 ft. long by 45 ft. wide, with separate counters for registered letters and parcels, money orders, letters, delivery, sale of stamps, and general inquiry. The Postmaster's offices immediately adjoin the public hall, the remainder of the ground floor being occupied with the various departments for handling letters and parcels for incoming and outgoing mails. The mail bags will be delivered and despatched by the private road at the back of the building where there will be no obstruction from passersby. Under the Southeast tower at the corner of Des Voux-rd and Pedder-st, is placed the entrance with an elevator and staircase, for Europeans, for the offices upon the upper floors. The Treasury and the offices of the Registrar-General are located upon the first floor, a spacious emigration yard being provided on the flat roof over part of the post office sorting rooms.

The second floor is devoted to the Sanitary Department, but room is found also for the Inspector of Schools and the Government Auditor, as well as a residential suite of rooms for the chief clerk in the Post Office, who has to be always upon the premises.

The third floor will eventually be occupied by other Government departments, but the allotment of the rooms here has not been definitely decided upon as yet.

Messrs. Dennison, Ram & Gibbs, the architects, have designed the buildings in a free adaptation of the style of the English Renaissance. The general wall faces are to be executed in Amoy red bricks, and the mouldings, cornices, dressings, etc., in white granite. In a climate such as prevails in Hongkong the constantly recurring cost of painting and color-washing forms a very heavy item of expenditure, and the use of superior materials in preference to the soft bricks and plaster usually employed there seems certain to prove a stroke of economy in the long run, in addition to the advan-

(Continued on page 5.)



FRONT ELEVATION OF NEW GOVERNMENT OFFICES, PEDDER-ST, HONGKONG

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FAR EASTERN REVIEW

COMMERCE :-: ENGINEERING :-: FINANCE

A MONTHLY REVIEW OF FAR EASTERN TRADE, FINANCE, AND ENGINEERING. DEDICATED TO THE INDUSTRIAL DEVELOPMENT AND ADVANCEMENT OF TRADE IN THE PHILIPPINES AND FAR EASTERN COUNTRIES.

GEO. BRONSON REA, M. E.
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MANILA AND SHANGHAI, JULY, 1905

PUBLISHER'S ANNOUNCEMENT

We beg to inform our readers and advertisers that we have opened a branch office in Shanghai, with temporary headquarters at No. 5, The Bund.

PHILIPPINE TARIFF REFUNDS.

There appeared in a recent issue of *The Louisiana Planter*, the official organ of the immense sugar interests of the southern section of the United States, under a Washington date, the following misleading and injurious reference to the Philippines:—

"That our possession of the Philippines is proving a source of annoyance and expense, and is likely to continue to do so, was convincingly brought out this week (of May 22d) by United States Solicitor-General Hoyt, in his argument before the Supreme Court for a rehearing in behalf of the Government, in the case of H. W. Peabody & Co. and Warner, Barnes & Co., Ltd., against the United States. These are the test cases brought to recover the customs duties collected prior to the duty of March 8th, 1902, and after ratification of the treaty with Spain. The Solicitor-General, in closing a petition for a rehearing of these cases, said:—

" 'Without magnifying possible dangers, it is evident, I think, that while the opinion of the court strikes down only the tariff on merchandise from the United States, the legality of the entire structure of civil government after the ratification of the treaty is involved and may be denied hereafter relative to other features not now presented or foreseen, if the Supreme Court adheres unqualifiedly to the logic of this opinion. The court would not regard as controlling either the large amount of money involved or the fact that the claimants added the duties to the price of their goods. But it is worth while to point out (as accentuating the great importance of this case) that the refunds called for under the decision of the court will reach the sum of seven million dollars, and that this vast sum will be paid in large part to claimants, many of them aliens who, as public records show, were on the whole opposing rather than supporting the authority of the United States.' "

By the above the Washington correspondent of *The Louisiana Planter*, which paper, by the way, is one of the bitterest enemies to favorable legislation by Congress for the commercial and industrial relief of the Philippines, endeavors to make it appear that refund of the duties collected in the Philippine Islands is a source of "annoyance and expense" to the United States, thus creating prejudice against the Islands in the minds of the readers of this organ of the sugar trust. It is only necessary to remember that the recent decision of the United States Supreme Court only orders the Washington Government to return that which it has taken away from others without right or authority, in order to refute the charge that this refund is an expense to the Federal Government. For every dollar that will be returned by the United States in compliance with this decision, there has been a dollar put into the treasury at Washington, which ought never to have been collected. Plainly the only expense that the United States has incurred in the matter has been the amount expended in her efforts to retain these monies. As for the "annoyance" charged, there is no other "annoyance" than that ordinarily felt when one is compelled to return to another that which has been unlawfully received.

The quotation, in the published communication, of the extract from the petition of the Solicitor-General of the United States, is very apt, and ought to bring good cheer to everyone in Manila interested in this refund. It is not usual to ask the Supreme Court to reverse its decision on the ground that there is a large amount of money involved. The solicitor general recognizes this and apologizes for basing his petition on an appeal to the sympathy or prejudice of the court. He is undoubtedly right in his prediction that the court will not regard any such appeal. He might have gone a step further and predicted that the court will reply that the more money there is involved, the more urgent the demand for granting the refund. But the significance of the fact that the court has been asked to retract its decision on the ground that much money is involved is that an appeal on such grounds indicates clearly that there are no sounder or better ones on which to base it. It is a palpable confession that there is no room to dispute or question further the law of the case as laid down by the court in its decision. And since the Supreme Court will pronounce judgment in accordance with the law, and in utter disregard of all else, this assurance of the soundness of the decision, coming as it does from the Government's counsel, is reassuring.

The only unpleasant feature of the entire matter is the fact that the Solicitor-General, in the desperation of following a lost cause, has felt a necessity to insult the merchants of the Philippines who have presented claims, by characterizing them as aiders and abettors of insurrection. There never has been a time in the history of jurisprudence when lawsuits have been won or lost by calling names or throwing mud, and the Solicitor-General has not even the excuse of loyalty to his cause. The gratuitous assault which he makes upon the fair name of the Americans and foreigners who seek to recover what has been unlawfully collected from them is unjustifiable and one to which persons ought not necessarily submit themselves as a penalty for beginning suit against the United States. Let those who are "annoyed" by this decision of the Supreme Court get what comfort they may out of calling names. The loyalty and obedience of the Manila merchants to the authority of the United States are too well established to be seriously affected by the sweeping and unfounded allegation of the distinguished Solicitor-General.

The communication in *The Louisiana Planter* suggests to mind the opposition made to this refund by the Secretary of War. Mr. Taft based his objections to the refund on the ground that the duties unlawfully collected have not come from the purses of the merchants but from the consumers who had paid higher prices for their wares. If we leave aside the legal right of the importers to recover these duties, and enter upon a consideration of the ethics of this recovery, it will be seen that there is at least as much to be said in favor of their moral rights as of their legal rights. It will not be seriously disputed that the higher prices obtaining on account of the duties imposed on imports had a depressing effect on business in general. The quantities of commodities sold at the higher prices were greatly less than the quantities that might have been sold at lower prices. The collection of the unlawful duties, by adding to the price of things without increasing the merchant's profits one iota, diminished his business materially and was a source of loss to him. Furthermore, the merchants who paid these duties were also large consumers of commodities imported by others, upon which they paid the higher prices, and as employers of labor were compelled to pay high salaries on account of the prevailing high prices of living. Thus it will be seen not only that the merchant has the legal right to this refund, but also that it is unjust and untrue to claim that the refund is a gift to the merchant of monies which he in turn has made the consumer pay to him.

It is to be regretted that Secretary Taft has adopted this view and has thrown the weight of his appreciable influence against the prompt payment of these claims now adjudged to be proper, right and lawful. The distribution of this refund among the commercial houses of the Philippines, and the placing of the appreciable sum involved into circulation in the Islands would be a material benefit and uplift to struggling commerce. It would offset, to some extent, the injustice done to the Islands by the delay of Congress in removing the tariff wall between the United States and the Islands. So true a friend of the Islands as its former Civil Governor has been and still is ought not to oppose what will be a just, equitable and acceptable boon to our commercial interests.

ADVERTISING.

The British Consul at Chicago, U. S. A., writes:—

"The American believes in advertising, and uses it to the utmost. It is impossible for the British manufacturer to hold his own, to say nothing of increasing his trade, on the Continent, unless he adopts the same system as his rivals. There are many British goods, which, if advertised in the United States in the same manner as the American competing product, would, because of their superiority, soon obtain a hold on the market and give good return to the advertisers. This trade can be got, as is shown by a well-known and well-advertised soap that has an enormous sale and holds its place, notwithstanding the fact that its price is about three times that of its competitors. In America and Canada the methods of obtaining business are alike, and those

methods must be used by the British manufacturer; but in so doing there are so many mediums, conditions, and even idiosyncrasies of localities to be considered, that each case and the best manner of advertising must be considered on its own merits." * * * *

These terse remarks can be applied to trade and industry in the Far East with greater force than in the United States and Canada. Manufacturing development and commercial concerns out here represent so many different national interests in the Orient, and the competitioh among them for the constantly and rapidly growing business is so keen, at the present time, that liberal but judicious resort to printer's ink is just as important to the prosperity of the concern as it is in America or anywhere else in the world. Experienced advertisers invariably turn to trade and industrial papers as the best medium through which to promote their goods and products. The field of this class of journals is usually broader in its scope than that of the newspapers. Advertising in a trade and industrial journal reaches all classes of commercial concerns whose entire interests are centered in what is going on in the industrial and other fields of the sphere in which they operate. There has been a large increase in the expenditure of money for advertising throughout the Far East during the last ten years, and the appropriations for this adjunct of trade and industrial expansion is still growing. We are willing to concede to the established daily newspapers their local influence and the local value of their advertising columns; but to the trade and industrial journal is where the commercial man, the financier, and the manufacturer must turn in the competition for general business. Judicious advertising in high-class journals of the latter class brings the best returns in the end even though direct results are not always appreciably present.

COMMERCIAL ATTACHÉS IN CHINA.

The United States Government has long enjoyed the distinction of converting its consular representatives into commercial agents with instructions to forward full and complete reports on the trade conditions of their respective districts. These reports from every part of the world, published monthly in magazine form, and distributed broadcast throughout the country, have been a great help in extending American export trade, and the system was taken up by other countries. But there is still much to be desired in the text and thoroughness of these reports, due largely to the inexperience of the average consul in commercial lines and his inability to properly present the matter for publication. Again, when he does happen to possess the latter quality, he very often dives into the most intricate trade questions without first acquiring the necessary information about the local markets and methods to be employed in introducing new articles.

Experience has taught us that the average manufacturer, or large commercial house, has no use for lengthy reports on the resources of a foreign country, or its future development, but is keenly interested in what is actually taking place, and the report of a new industrial company being organized and the possible chance of selling it something is of far more value than long-winded and dry statistics. The modern trade paper is an example of how such matters should be treated. The items of new companies, new contracts, new appropriations, etc., are the real news which the business man first reads. The main articles are to read at leisure, and kept for reference. It is generally conceded that as much new business is secured by a manufacturer by following up these trade paper pointers as by direct solicitation.

The possibilities for the expansion of trade in China is unlimited, and the end of the present war will herald a period of commercial activity calling for a vast increase in the importation of foreign manufactured goods. With all that has been written about the Empire, and the immense possibilities of development, little has been given to actual progress and immediate opportunities of disposing of manufactured products. This is the information needed by the commercial world, and what THE FAR EASTERN REVIEW is trying to supply; but no one publication can hope to fully cover the field and have world-wide circulation.

This work can best be carried on by the appointment of commercial attachés, whose sole duty should be to study and report on trade conditions. The work of Mr. J. W. Jamieson, the British commercial attaché in China, is an example of how much otherwise dry matter can be treated in an intelligent and interesting manner. His reports have been of the highest order and have shown a marked insight and familiarity with conditions in China, making them most valuable to British commercial firms operating in the Far East. Mr. Jamieson's reports on the trade of Tientsin and the cotton mills of China are models of their kind, and demonstrate what can be accomplished by one whose time is not consumed in routine consular work, acting as justice of the peace, postmaster, and other duties devolving on the average consul.

The United States Government should follow the example set by Great Britain and appoint a special commercial attaché in China, who will be free to travel around and observe conditions and compile intelligent reports of real value.

RUSSIA'S MANCHURIAN ASSETS.

Anent the efforts of President Roosevelt and others to bring Russia and Japan together for peace negotiations, a glance at the assets of Russia in Manchuria is interesting. It is sufficiently plain that every week in which the war is protracted must bring an increasing pressure on the Czar and his advisers to make the best terms they can with their victorious adversary. The cession of territory and the payment of an indemnity may be excluded from consideration today, only to be regarded as open for discussion tomorrow. Till they are so regarded, it is safe to assert that all peace talk is idle. While it is true that an indemnity from a conquered nation has hardly ever been exacted in our time except as the price of territory in actual occupation of the enemy, and while it is obvious that no possible indemnity could repurchase for Russia her possession of the Liaotung Peninsula, the fact must be borne in mind that though the rest of Manchuria is Chinese territory, it contains a great deal of valuable property owned by the Russian Government.

The prime asset is the railway—nominally the property of a joint stock company organized under the auspices of the Russo Chinese Bank, actually built out of the proceeds of loans issued by the Imperial Treasury. As it stands, with all its rolling stock and adjuncts, the railroad has probably not cost less than $250,000,000. That its actual value is considerably lower need hardly be stated, but it is also true that there are adjuncts in the shape of river and sea-going steamers and mining privileges which add very considerably to the value of the railway property. The conditions under which the railway was constructed included the recognition of a right on the part of the Chinese Government to take over the railway, on the expiration of thirty-six years, after payment of its actual cost, together with all accrued debts and interest. After eighty years the Chinese Government reserved the right to acquire the railway without payment. By an additional clause of the agreement of 1898, Russia obtained the right to police a strip of territory extending for 15 *versts* on either side of the railroad wherever it might go, and also the sole right to exploit any mineral deposits she might find within this strategic area. That the railway should be treated as part of the spoils of war does not admit of serious dispute, and it will be a matter of future agreement, it is presumed, between China and Japan, what modifications, if any, should be introduced in the agreement under which the railway was constructed. But, obviously, it would only be fair to recognize that the value of the railroad property might be set off as a part payment of any indemnity that may be agreed upon. As a matter of fact, the railway has been a consistently unprofitable investment for Russia if account is to be taken only of its commercial returns. All investigators have retired baffled from the task of finding out what its monthly receipts were before the war.

Judging by the Russian standard of operations, the value of the railway as a going concern for the purposes of commerce amounts to precisely *nil*. But there is no reason why, in competent hands, it should not be employed to develop the country through which it leads, and to do a highly profitable business in the immediate future, if not in the near present. It is the judgment of competent observers that an income of $10,000 per mile per annum is easily within reach, and that the railway steamers could at least be run without loss. There is a winter caravan traffic in Manchuria employing over 100,000 long carts, each of a 2-ton capacity, which legitimately belongs to the railway. But, under the Russian régime, it was at once cheaper and safer to send by cart over nearly every caravan route in Manchuria than by the iron road. The great Manchurian articles of export are beans and bean products, collected all through the winter at points on the frozen River Liao. As soon as the river opens in spring, huge fleets of junks convey this produce down to Newchwang, where it is prepared for shipment. The entire movement has been estimated to amount to over 1,000,000 tons in four months, and while it may be a question whether the railway can ever beat the junks in transportation rates, it does seem possible that they could be met, were the freight business conducted on the Amererican or British plan and the road worked to its full capacity. It is conceded that were a double track to be built between Port Arthur and Harbin the passenger traffic would pay very handsomely, and a treble track between certain points such as Tiehling, Mukden, and Newchang could be made to pay so enormously that it would more than make up for a probable deficit on the far Northern section.

These represent in outline some of the considerations that are likely to govern the future ownership and operation of the Chinese Eastern Railway, and that will necessarily play a very considerable part in the adjustment of the conditions of peace.

REVIEW

"Steam."—Fifth British Edition, January, 1905.

We have just received through the courtesy of Mr. David W. Bell, the China representative of Messrs. Babcock & Wilcox, Ltd., a copy of the 1905 edition of their valuable catalogue and treatise on steam.

"The North China Desk Hong List, 1905." (North China Herald Office, Shanghai, Publishers.)

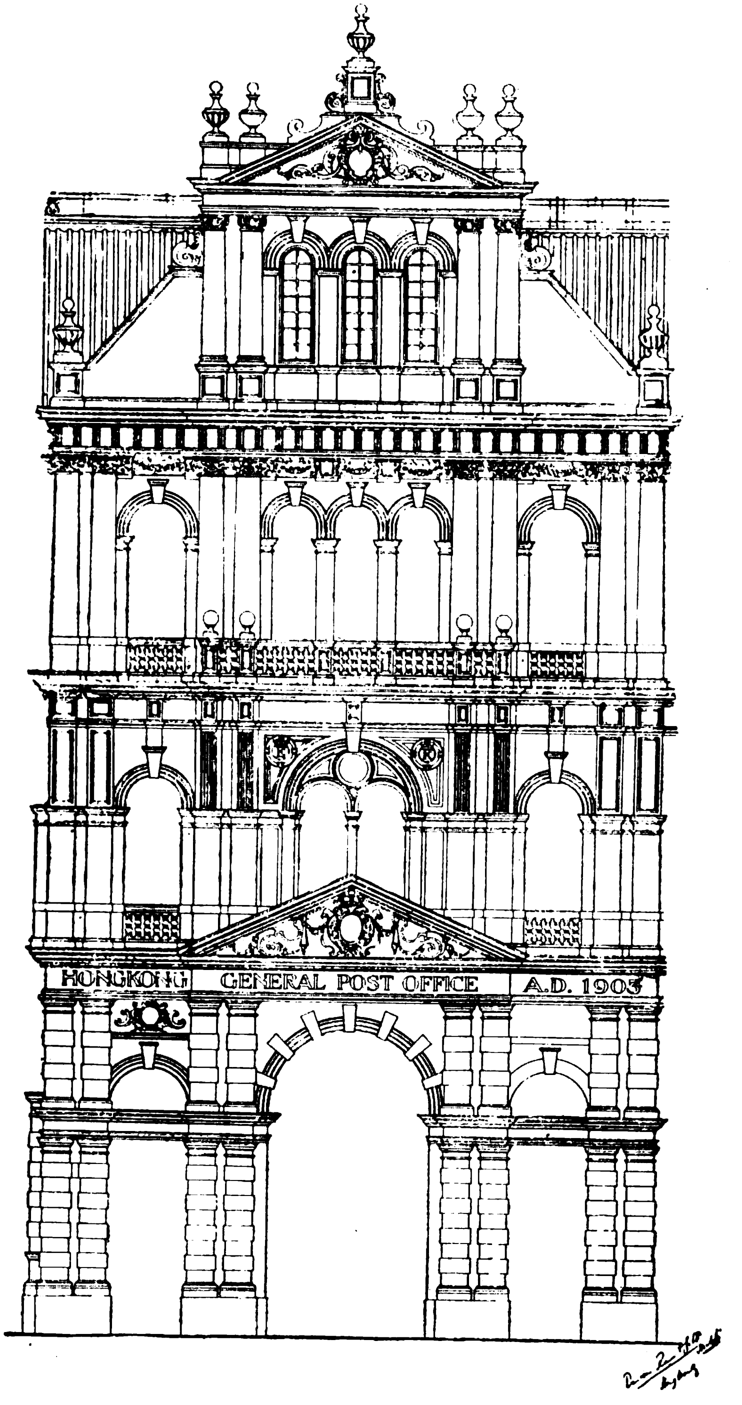
The 1905 edition of this general trade directory covers a wide field of useful and necessary data, besides the regular list of commercial houses. The directory section includes Shanghai, Hangchow, Hankow, Ichang, Kiukiang, Mokanshan, Nanking, Newchwang, Ningpo, Peking, Shasi, Soochow Tientsin, Tsingtao, Wei-hai-wei, Wenchow, Wuhu, and Korea, besides a general list, covering all ports, and a ladies' list. Price, $3 silver.

"Treaties between the Empire of China and Foreign Powers, together with Regulations for the Conduct of Foreign Trade, Conventions, Agreements Regulations, etc., containing also the Peace Protocol of 1901, and the Commercial Treaty of 1902."—Fourth Edition. (North China Herald Office, Shanghai, Publishers.)

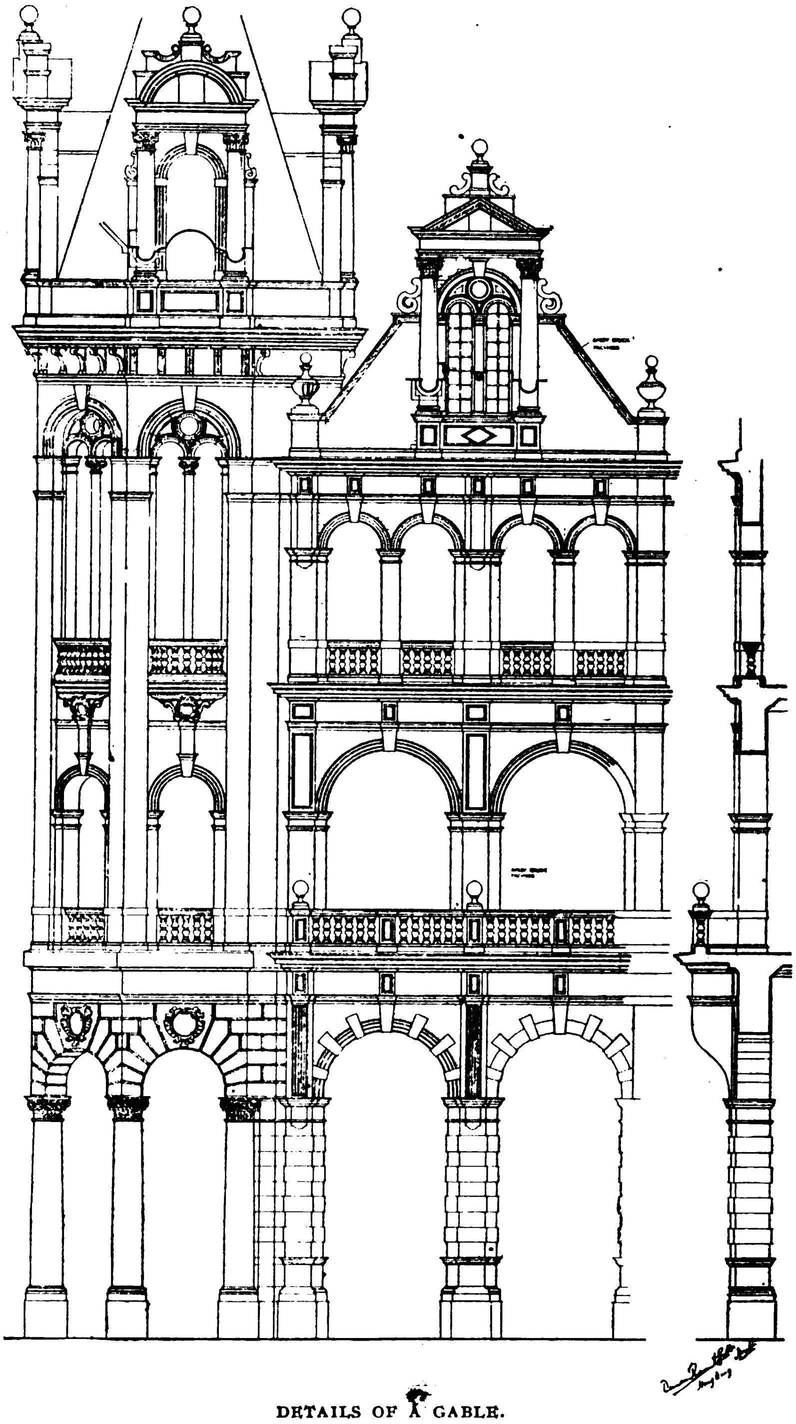
This volume is a most valuable aid and reference to the foreigner seeking exact information as to the treaty rights enjoyed by the subjects of each individual Power. The volume is a compilation of all the international agreements concluded by the Imperial Chinese Government, and which are either printed in full, or where circumstances have rendered this inadmissble, in an abridged form. Price, $4 silver.

"Gold Mining Machinery," Joshua Hendy Machine Works, San Francisco.

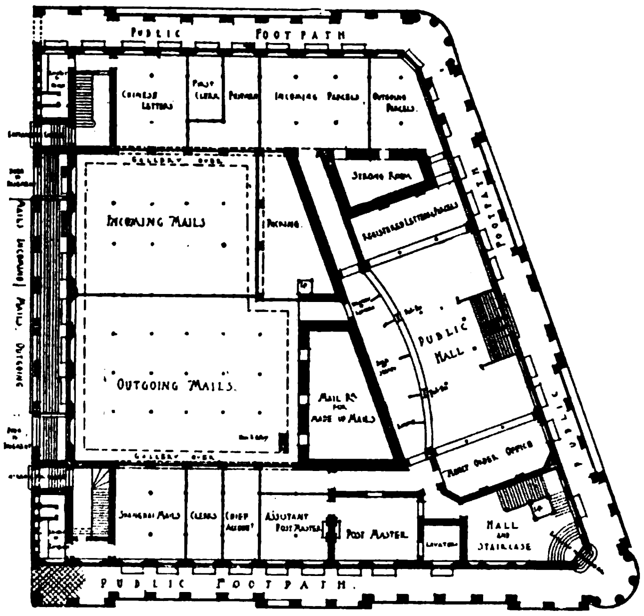
This is an elegant and profusely illustrated catalogue, with embossed cover, of the high grade products of a long established and well-known firm of American founders and engineers.



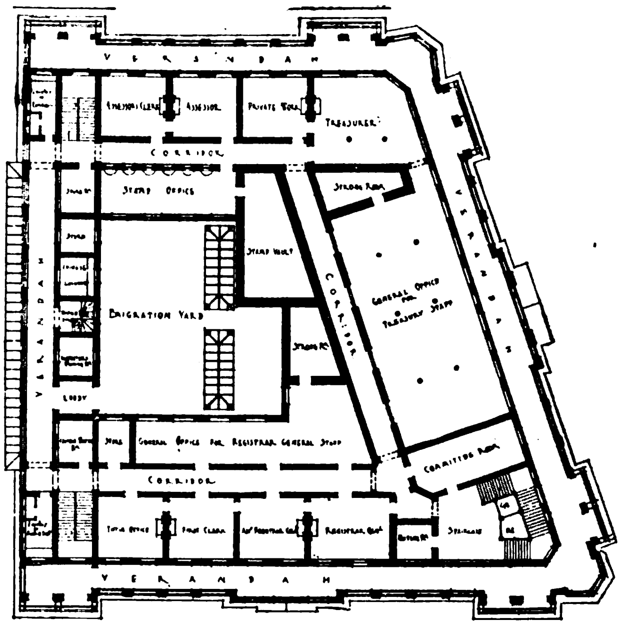
DETAILS OF CENTRAL ENTRANCE.



DETAILS OF A GABLE.



GROUND PLAN.



FIRST FLOOR PLAN.

NEW GOVERNMENT OFFICES OF HONGKONG COLONY

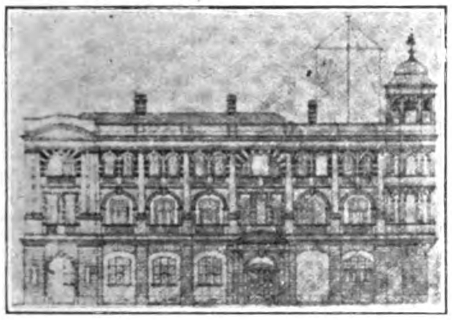
(Concluded from page 1.)

tages such superior materials possess from an architectural point of view.

The floors and woodwork of the general interior are designed to be executed in teak, and plaster and concrete is general throughout the work. A verandah over the public footways is provided in the three main streets against which the buildings abut.

The lighting will be by electricity throughout, and lavatory accommodations are provided for the European and native staffs upon each floor.

Work on the foundation's contract for these buildings was begun at the end of 1903, and at the end of 1904 all the excavation had



ELEVATION HARBORMASTER'S OFFICE.

been done, and most of the 1722 necessary piles driven. Some delay was caused by a ship with a load of piles being wrecked. Great difficulty was met with in this work owing to the freedom with which the sea water found access through the loose rubble foundation to the Praya wall and culvert on the East side of the works. Difficulty was also experienced in getting the piles in the East trench down to a sufficient depth owing to the presence of loose rubble under the culvert. This necessitated some modification of the foundation plans, iron joists being introduced into the concrete base to tie the shorter piles in with those which were put down to the full length.

NEW HARBOR OFFICE.—According to the annual report of the Hon. Mr. P. N. H. Jones, Director of Public Works, progress with this improvement has been unsatisfactory, due to the supply of granite again being insufficient. At the beginning of the current year the walls had reached an average height of 21 ft. above ground floor level, except the North wall which was delayed until the colonnade piers were at the required height for arches to be turned connecting the same to the wall of the building. Since the first of the year progress on the structure has been very much more satisfactory.

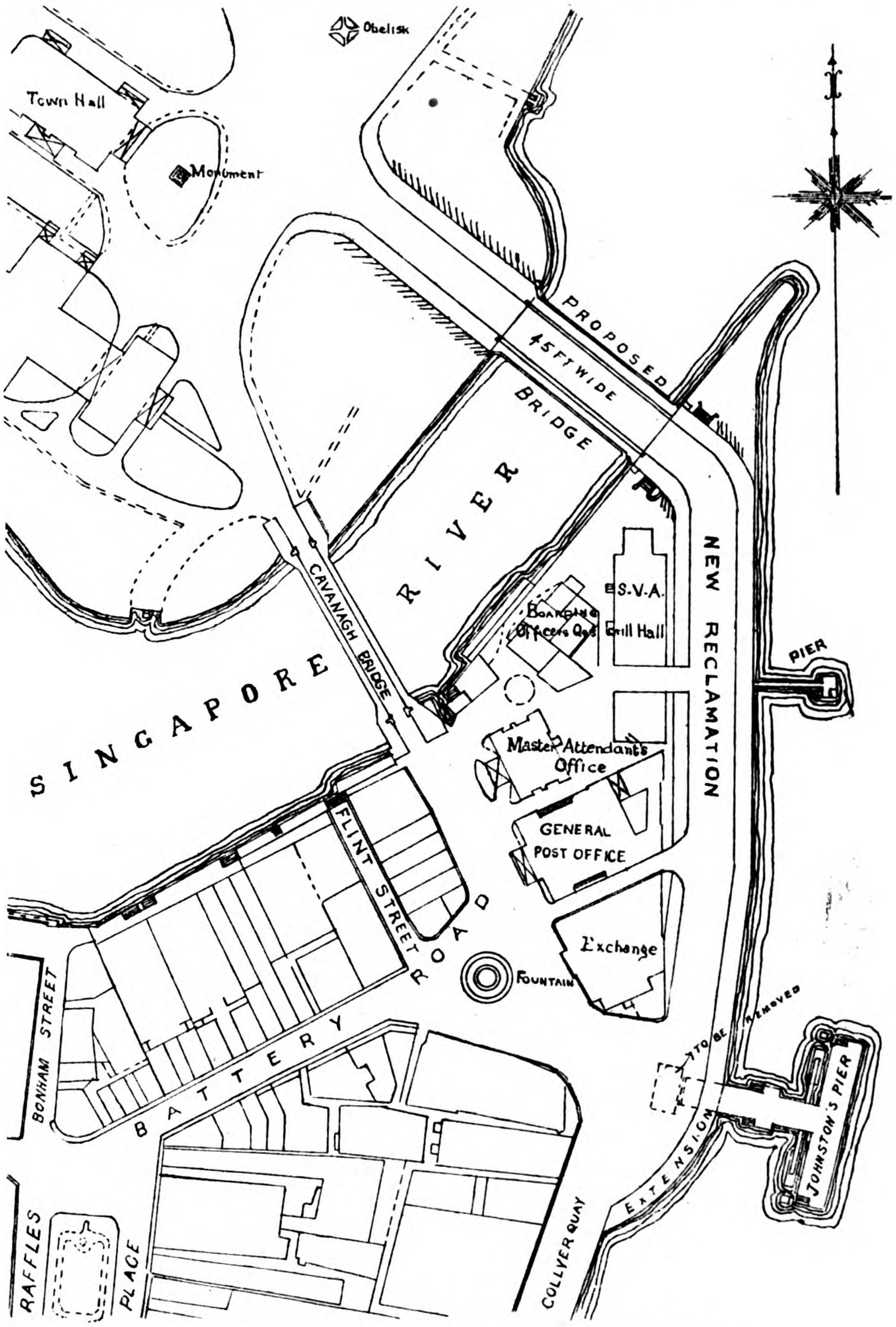
GOLD MINING IN KOREA

The Insan gold mine is located near Haing-Yang, in Korea, and it is conducted by British capitalists. A China paper says that after a considerable period of satisfactory working it is now reported that the reef has "broken off." It was not merely a matter of the reef "petreing" out, it did not "pinch" in any way, but just one of those unaccountable breaks that are found in nearly every part of the gold-mining world with the exception of South Africa, where as an old Irishman once said the veins are all loads and every little leader is a well defined true fissure reef. The Korean country is not supposed to be highly volcanic, that is, the volcanic action with its consequent erratic features is not in common evidence. The mine experts, however, entertain a strong hope of "picking up" the reef elsewhere, and careful fossicking is being conducted in order to find any outcrop or indication of its position. Several small leaders induced trenching, but no depth has been gone and the main reef only showed on the surface at one spot and maintains an even depth of some twenty feet of the crown elsewhere. Very little hope was therefore entertained as the outcome of trenching merely as deep as one man could throw the soil (about 12 feet at the most). Several adjoining properties have been acquired, but if the reef is not again discovered the fine plant of machinery will be a heavy loss. The old mine is said to have reached a flow of water that prevented further sinking, hence the driving and steping that resulted in the discovery of the break. A considerable quantity of ore is "at grass" and the quality of what is thus lying in the paddock is very rich.

SINGAPORE RIVER BRIDGE

Plans for the proposed new bridge over the mouth of the Singapore River and of the seafront reclamation, at Singapore, S. S., prepared by the Municipal Engineer, Mr. R. Peirce, have been approved by the Municipal Commission and are now in the hands of the traffic to justify the maintenance of two bridges, so there seems to be little doubt that the Government will authorize the construction of the proposed new works.

The structure is designed to be 45 ft. wide, and from the Town Hall end will lead to a road that lies along the seafront on the new reclamation, behind the volunteer drill hall and the postoffice building, and debouching upon Collyer Quay at Johnston's Pier. The plans, herewith presented through the courtesy of *The Straits Budget*, show at a glance the route.



PLAN SHOWING PROPOSED BRIDGE OVER SINGAPORE RIVER.

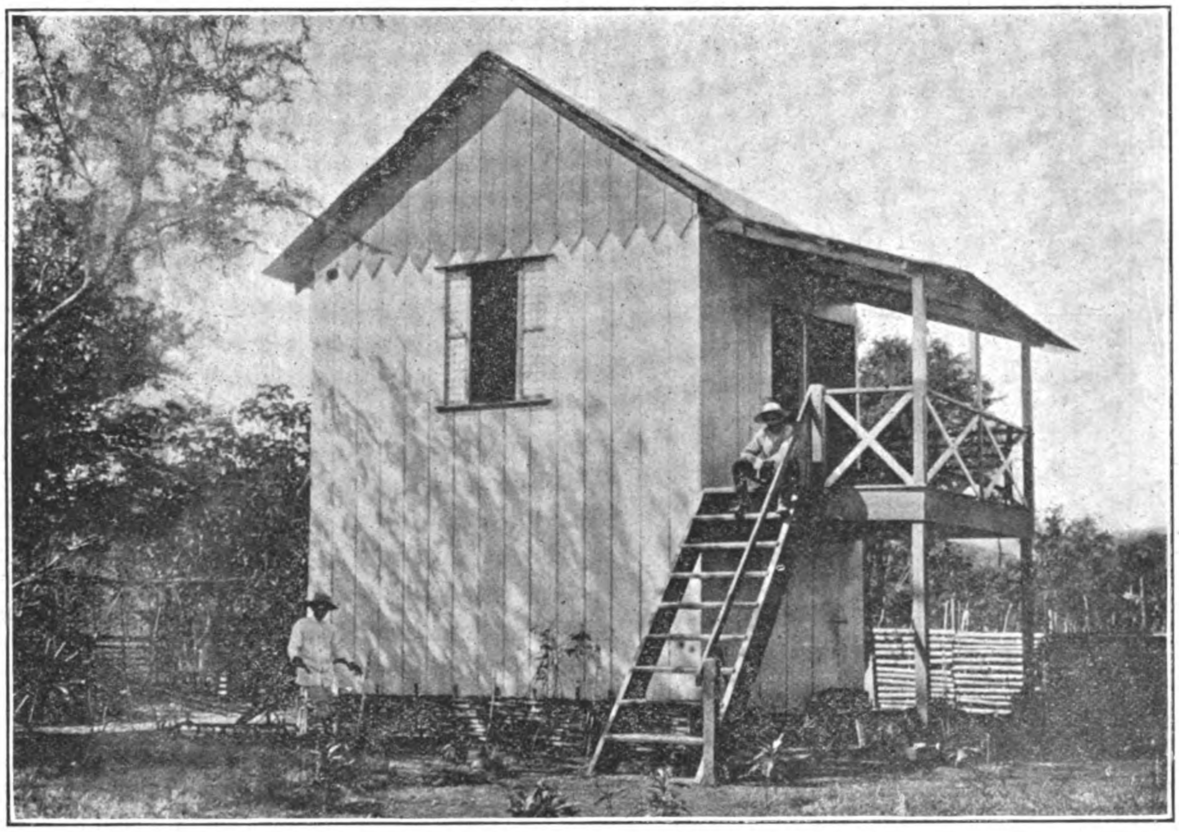
Legislative Council of the Straits Settlements for final disposition.

There has been a growing necessity for a new bridge across Singapore River either to supplant or replace the present Cavanagh Bridge. According to the expressed opinion of experts there is a sufficient amount of

Singapore's progress in internal improvements is today greater than it has ever been, and the energy it is showing along this line is drawing all branches of trade to its port. The new bridge is only one of the many constructions of a public nature in progress or under consideration.

FORESTRY DEVELOPMENT OF THE PHILIPPINES

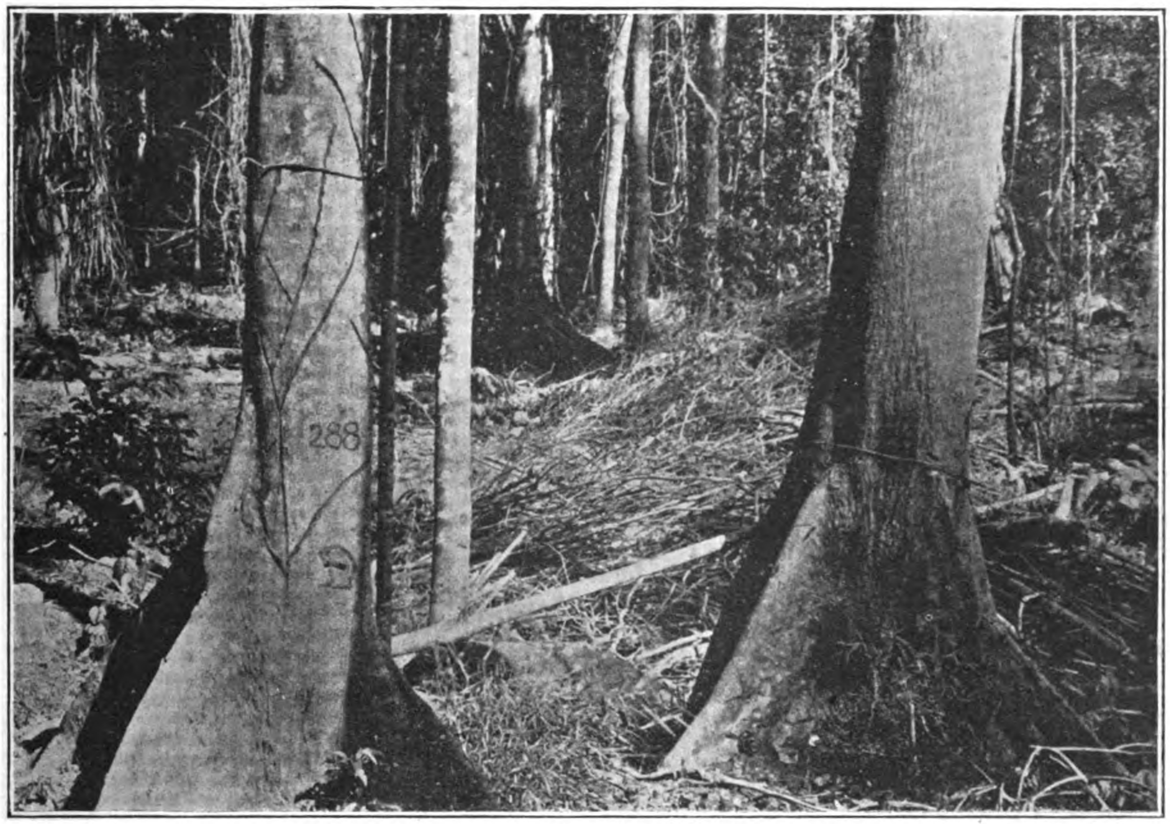
(Government Reserve in the Province of Bataan.)



LAMAO FOREST RESERVE.—HOUSE AT LOWER OR FIRST STATION; NEAR SEACOAST.

In his last annual report Captain George P. Ahern, 9th U. S. Infantry, Chief of the Bureau of Forestry of the Philippine Government, deals most entertainingly with the development of the Lamao Forest Reserve which was set aside by proclamation of the Governor-General, July 26, 1904. This reserve is located in Bataan Province in the basin of the Lamao and Alangan Rivers, where elevations from 0 to 4,500 ft. exist, and contains approximately 12,000 acres extending upwards from sea level. Adjoining the seacoast for a distance of 3 miles inland the land is fairly level, varying to moderate slopes towards the base of the ridges. From this point to the top of the mountain the surface is characterized by long and steep ridges, heavily timbered. The Lamao River on the south side

FOREST SCENE IN THE UPPER PART OF LAMAO FOREST RESERVE.



LAMAO FOREST RESERVE. NO. 288, MALACMAC (*Palaquium oleiferum* BLANCO); PALAC PALAC (*Palaquium latifolium* BLANCO) (TREE TO THE RIGHT).—NO. 288 HAS BEEN SLASHED FOR THE COLLECTION OF GUTTA-PERCHA.

and the Alangan River on the north furnish an abundant source of water supply for the reserve during the dry season. Three stations have been established—one on the beach at Lamao, the second 2½ miles inland at an elevation of 250 ft. above sea level, and the third 10 miles from the bay at an altitude of 2,000 ft. Trails have been established everywhere throughout the reserve, making the summit of the mountain easily accessible from many directions and furnishing an excellent opportunity for the study of the rich flora of the upper ridges and summit. Work on the first type area of forestry has progressed rapidly. It begins about 4 miles back from the coast at an elevation of 500 ft., and extends up the north side of one ridge and down the other, and also for a distance along the top of the ridge, thus giving several different exposures. More than 1000 trees have been labeled and more or less botanical and other material secured. Instead of following the Java method of taking a tree at random every tree within a certain area is marked. In this way a number of trees of each species, of various sizes, is being frequently included, and studies on the rate of growth and other physiological problems are carried on in connection with the type area. The distance from Manila to the reserve

TYPE AREA, LAMAO FOREST RESERVE.—NO. 97, PANAO (*Dipterocarpus vernicifluus* BLANCO). NO. 98, GUIJO (*Shorea guiso* BLANCO). NO. 101, BOLONG-ETA (*Diospyros pilosanthera* BLANCO). NO. 102, TOCUD LANGUIT (*Polyscias nodosa* SEEM.). NO. 103, UNDERMINED. NO. 114, ALUPAG (*Euphoria cinera* RADLK.). NO. 115, LAUAN (*Anisoptera thurifera* BLUME).

LAMAO FOREST RESERVE.—CAMP OF VISITING BOTANISTS.

by water is but 22 miles, and can be readily reached by launch in three hours.

BUILDING AND IMPROVEMENTS.—The reserve grounds along the beach are being devoted almost exclusively to ornamental purposes, and the salt marshes nearby are being utilized in the furtherance of this object. The nipa palm thrives in this locality, is of economic importance, and is very attractive in appearance when properly grown and tended.

The building at the first station consists of a two-story frame cottage with two or three smaller buildings used as storerooms. The grounds surrounding the cottage are fenced, and a good beginning has been made in the way of improving the appearance of the place by constructing a gravel walk, sodding the yard, and planting a few ornamental shrubs and flowers.

At the second station four houses have been built for the laborers—one dwelling house; a stable 18 by 40 ft. with shelter room for wagon and implements; a lath propagating house 15 by 35 ft.; and an orchid house 18 by 45 ft. In addition to the buildings on the grounds, a permanent camp, with several small houses, usually occupied by botanical collectors and visiting botanists, has been established on the river about one mile above this station.

The grounds and nursery at this station have been fenced in only on the lower side, being partially protected on the upper side by the river.

The construction of canals for irrigating purposes at the first and second stations have been started, and when completed will furnish an unlimited amount of water for nursery work. The length of the main ditch at the

PINE *(Pinus merkusii)*; OPEN STAND NEAR SANTA CRUZ, ZAMBALES

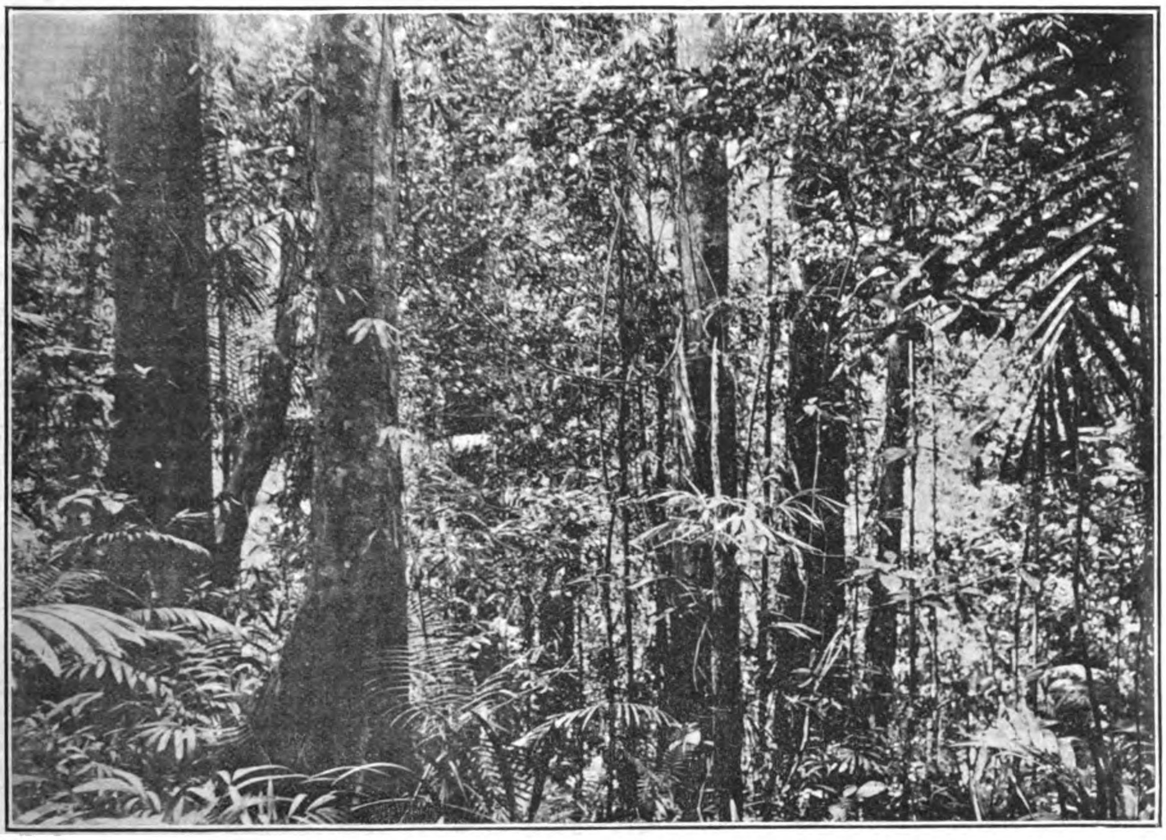
STATION NO. 2, LAMAO FOREST RESERVE.—DWELLING HOUSE OF NURSERYMAN IN CHARGE.

first station is about 1,400 yards, including the ditch through the gardens. There are several streams between the grounds and the point at which the water has been taken from the river, so that flumes have had to be constructed across these streams. The length of the ditch at the second station does not exceed 800 yards, as it is not necessary to go a greater distance up the river to get ample fall to carry the water, only one flume being required.

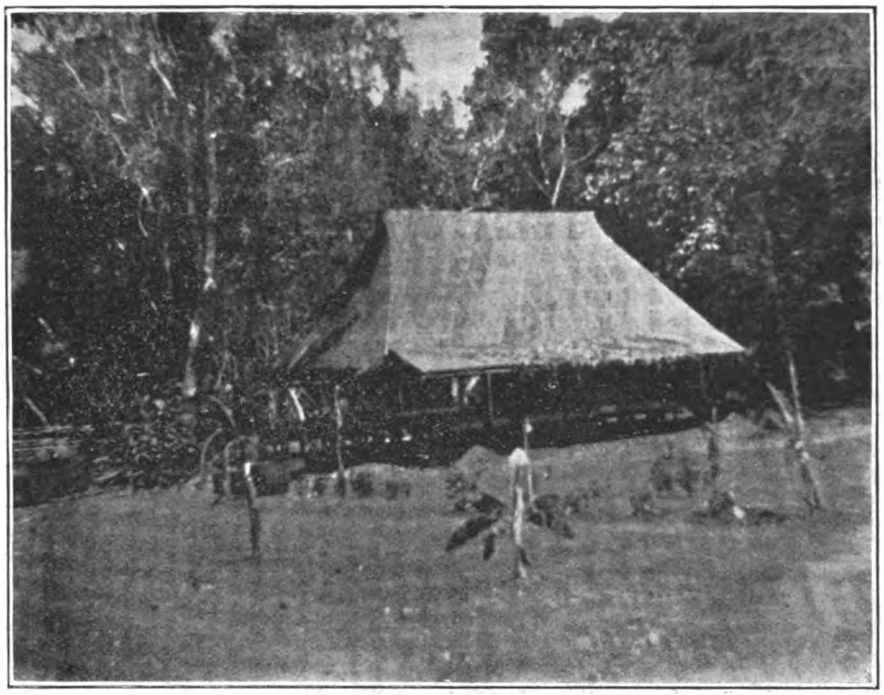
Most of the material used in the construction of buildings and in making improvements was secured on the reserve, thus saving cost and transportation.

A wagon road has been constructed from the first to the second station, and three bridges built over the intervening streams.

This road has been extended to the third station, but is not in condition for vehicle travel beyond the second station, as the steep hills and narrow ridges encountered toward the top of the mountain make the construction of a roadway for wagons too expensive an undertaking at the present time. The present road furnishes a very good pathway for pack trains, and answers all the requirements for the time being. It is planned to continue the trail to the top of the mountain at an early date for the use of botanists and collectors who may wish to work in that region.



FOREST VIEW IN LOGGING DISTRICT OF INSULAR COMPANY, GIMOGON RIVER, NEGROS OCCIDENTAL.—LAUAN (*Anisoptera thurifera* BLUME), ON EXTREME LEFT. APITONG (*Dipterocarpus grandiflorus* BLANCO), IN FOREGROUND.



LAMAO FOREST RESERVE.—PROPAGATING HOUSE AT STATION NO. 2.

Two small houses were recently built at the third station, a tract of land cleared, and several acres planted in fruit trees and nursery stock, a large part of the imported nursery stock being put out at this station. After getting the work well under way a reliable Filipino was placed in charge, who is competent to take care of the nursery and orchard under proper direction.

The grounds of the third station, at 2,000 ft. elevation, can not be irrigated so easily as at the lower stations. The small stream from which the supply of water will have to be secured is 40 or 50 ft. below the level of the grounds, and it will be necessary to raise the water by mechanical means, and pipe it to the grounds.

THE NURSERY.—Including recent plantings there are over 500 species in the nursery, the larger proportion of which are native timber trees and plants of economic importance. In addition, the list comprises a general collection of ornamental shade trees, palms, orchids, ferns, and flowers. The native species were collected almost entirely by employees of the bureau, but some contributions have been made by botanists of the Bureau of Government Laboratories while collecting in Bataan Province. Special effort has been directed to increase the number of native timber trees, and a circular letter issued requiring all employees in the field to make collections of seeds for this purpose. By this means the collection steadily grows in volume, and the condition in which seeds are received affords valuable information as to the requirements of the various species.

TIMBER-TESTING LABORATORY AND WORKSHOP.—The work of the laboratory and workshop during the first half of the year under consideration was devoted largely to the preparation of the forest exhibit for the Louisiana Purchase Exposition. The work was nearly all hand work, the wood-working machines not being installed until late in February.

The testing of timber was suspended to a large extent during the preparation of the forest exhibit and was resumed late in April, since which time it has progressed very satisfactorily. Up to April 22, 1904, 150 tests had been made of 82 different species. Since April 22, the work of timber-testing was under the supervision of Mr. Rolland Gardner, who made 113 tests on 58 kinds of woods, 46 of which tests were made on 13 different species of Borneo woods. The results of the above tests were tabulated. These tests, being made from a small number of specimens of each kind of wood, are merely approximations, but a more complete and systematic series of tests has recently been inaugurated. One hundred specimens 4½ by 4½ in. by 6 ft. of each of the six leading native construction woods have been secured from Manila markets and tests on the same are under way. Specimens were also secured from different provinces; complete data concerning each will be noted, including botanical and sylvicultural notes, location of forest from which specimen is secured, photographs showing tree form, bark, etc., as well as the uses of wood, prevailing prices in the log, and of the manufactured lumber, etc.

MANILA NATIVE WOODS MARKET.—The statistics compiled by the bureau show that during the past four years more than 700 kinds of native woods have entered the Manila market. Of this large number, 37 species represent fully 75 per cent of the total amount marketed. Complete test of these leading woods will be made within the next two years. With the limited force at work the tests on the first 20 were not completed until June, 1905. In testing woods the methods adopted by the United States Government are being followed as fast as practicable.

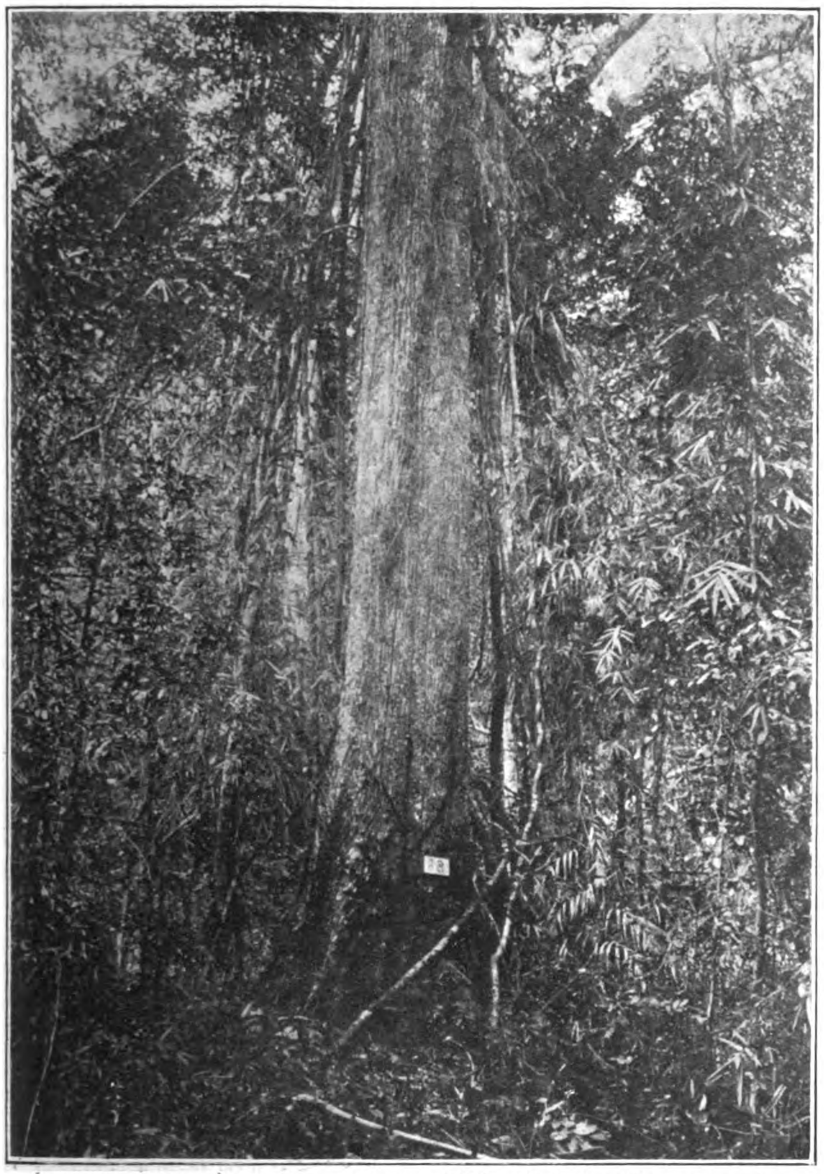
Sets of wood samples have been prepared of more than 80 species, which have been botanically determined, and the same will be distributed to scientific and other institutions in the near future. As a rule, a section 3 feet in length of the log which is sent in with the botanical material is taken and placed in the exhibition room in the laboratory. This section is so cut as to expose the sapwood and heartwood in plane surface and in cross section.

One fact has been noted in examining the native construction woods for moisture contents; viz, the woods that are used in ordinary construction in Manila are not seasoned, but are put into use immediately on being brought in from the forest. A recent test on a piece of *lauan* showed that it contained 73 per cent moisture, and a large number of pieces in the average lumber yard in Manila will show from 40 to 60 per cent moisture.

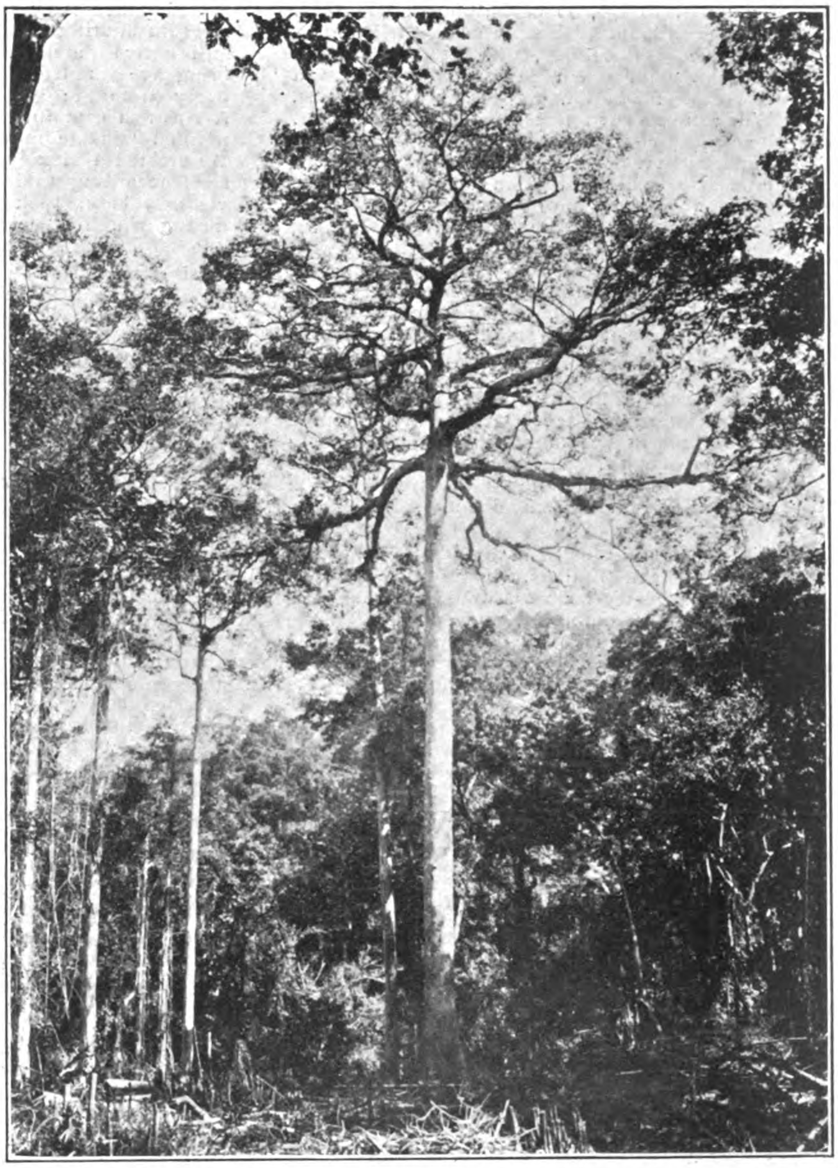
WOODWORKING EQUIPMENT.—A fairly complete set of woodworking machines has been installed in the workshop. Since the installation the work in the shop has progressed rapidly and with excellent results, the receipts for work done amounting to about -P-3,000 during five months, and in a short time the shop will be able to place itself on a paying basis.

This shop was established with two objects in view: first, to show the value and beauty of the more important woods and to find uses for woods which are not popular at present in the market, but which are found in abundance in the forests of the Islands; second, to train Filipinos as carpenters and as cabinetmakers, and also to teach them the use of different woodworking machines. The second object has not been successfully attained, due to the fact that the workmen will not remain long enough in one position to thoroughly master the work. This constant change of workmen suggested the idea of combining the work of this shop with the furniture factory at Bilibid Prison in Manila. This change was approved and three master cabinetmakers later transferred all the woodworking machines and supplies to Bilibid, and, combined with the machines ordered from the United States for the furniture factory and with the assistance of a large force of prisoners, they are now in a position to accomplish results much more rapidly than was possible in the old workshop.

"CAINGIN" OR CLEARING IN FORESTS MADE BY BURNING.—COCOANUT PALMS IN BACKGROUND DAMAGED BY FIRE.



LAMAO FOREST RESERVE.—TAGATOY *(Palaquium luzoniense* VIDAL). NO. A 3 ON TYPE AREA



LAMAO FOREST RESERVE.—PANAO *(Dipterocarpus verniciftuus* BLANCO).

An inventory gave the value of the bureau woodworking machines at -P-11,622.69; value of supplies, not including lumber and logs, -P-3,546 96; value of lumber and logs in the yard and in the kiln, -P-3,015.21

CAMARINES (P. I.) GOLD FIELDS

Mr. Frank de Thoma, of Manila, contributes some interesting early history of the gold fields in the Province of Ambos Camarines, Luzon, which would indicate that whatever may be the condition of the gold deposits in that location at the present, there was a time when the precious metal yielded in abundance.

After Don Juan Salcedo had conquered the Province of Laguna in 1572, says the writer, he heard there of some enormous rich mines in that section of the Island of Luzon which was afterwards called Camarines Norte, on the Pacific Coast, and set out in their quest. Undergoing hardships without name he arrived at the place called Paracale and convinced himself of the rich gold deposits existing there and which had been worked by the Indians.

In the year 1626, the ensign Don Diego de Espina discovered the mother lode of Paracale which can be traced for a distance of more than twenty-seven miles. Nine years later, on April 16th, 1635, King Philip IV issued in Madrid a royal decree, contained in the laws of the Indies in Book 4, Title 20, Law VI, expressly for these mines, which went into force in the Philippine Islands on September 22d, 1636, and is as follows:

"As some enormously rich gold mines, running twenty-seven miles from the North to the South, have been discovered in the Philippine Islands, of which an assay has been made by washing and quicksilver, and as others have been discovered and are now beginning to be worked by different persons: It is Our will that the miners of said islands enjoy all the privileges provided for and established by the laws and ordinances. And the Governors and Captain-Generals are commanded to exercise special care that the same be observed, and that the mines be worked and exploited in the manner most convenient for Our service, the increase of Our Royal Treasury, and the good of Our vassals."

Later on it seems that these mines did not produce one-quarter as much as at the time of their discovery.

At a distance of one and a half mile from Mambulao is a mountain named Calocot, through which passes a rich gold vein to which the natives give the name of mother lode and which divides itself in the middle of the mountain into two veins, one running to the East called the red vein, owing to the deep red colored gold extracted from it.

About six miles from Mambulao, at a place called Banuet, are several veins which produce a gold much finer and purer. The Indians give the name of Cacaton to these mines.

There is another old mine in Panacilaum as also in Malaquit, which in olden times gave rich product but are now abandoned.

To the Northeast of Mambulao, distant three miles, are the mines of Minalapayoan, which were worked before those of Calocot were discovered.

The Jesuit Father Francisco Colin in his work: "The evangelic, ministerial, and apostolic labor of the Society of Jesus, etc., etc., taken from the manuscript of Father Pedro Chirino, etc., etc., Madrid, 1663," says in Chapter XII, page 49, speaking of gold in the Philippines, as follows:

"In reference to gold, I am informed on good authority that on an average $100,000 have been taken out, and as this has taken place since more than 80 years, the total amount is a matter of easy calculation. Before the discovery of the Islands by the Spaniards large amounts were exported to Asia. Juan de Barros (a Portuguese historian) says that a large quantity of gold was taken from great Leqnio, which can be no other place than the Island of Manila or Luzon. On the other part, a positive proof of this conjecture is the large number of rubies *(piedras cornerinas)* met with in this Island of Manila in the gold-producing provinces and those adjoining them, because they are not found in the rough state but finely and perfectly cut, which is a sign that they came from other parts, and the natives confess that these stones are found in Borneo and India buried in the ground. The probabilities are that these stones were brought to the Island of Manila in exchange for gold, as they are only met with in provinces where gold exists. After their arrival, the Spaniards continued the exploitation of gold, and to prove the great amounts mined, it is sufficient to give the statement contained in a MSS. narrative of a serious person, one of the first settlers, which I have in my possession and which states that the first tribute paid

by the two provinces of Ilocos and Pangasinan amounted to 159,500 pesos, and that in 1587, in the *nao* Santa Ana, captured by the Englishman Thomas Embleg, this pirate took 3,000 taels of gold (each $1.25) belonging to a resident of Manila, *encomendero* of Ilocos. When the corsair touched the coasts of Manila, he sent a courteous note to the shipper, telling him that next time he made such a remittance, to send gold of more carats, because the one captured hardly had 22 carats, which is the ordinary grade in these Islands among the Spaniards. The Indians are satisfied with lower gold. The facility with which the gold may be extracted and the little cost of refining must also be considered, because all of it is taken by washing the sands of the rivers or at the utmost by crushing the rock which the natives then wash in wooden cans and take out the gold in dust and nuggets which are afterwards smelted. Consequently if a mine owner puts in the morning fifteen or twenty persons to work, some of the laborers dig out the dirt and sand, others to attend to the washing and finally some one melts the output.

"In this manner the owner has at 6 o'clock in the evening a little gold brick for his trouble. If the Indians, who do this work with their customary laziness, would show a little more energy, ambition, and spirit, or if the Spaniards would do the work with improved machinery, as is done in other parts, the output would be far greater. The Indian only labors in the diggings when the tax collector puts in his appearance for the tribute due, or when some other dire necessity compels him, and then only does he wash what is precisely necessary and not a shovelful more. Notwithstanding all these drawbacks there are still native traders in this precious metal who bring five hundred and more taels to Manila every time the galleon sails for Acapulco. A Spanish captain, a mining expert, was appointed 'alcalde mayor' of Paracale district. He erected a Mexican rockcrusher *(arrastre)* and, according to his wife, a veracious and virtuous lady, took out in the thirty days during which the crusher worked twelve and one half pounds of gold.

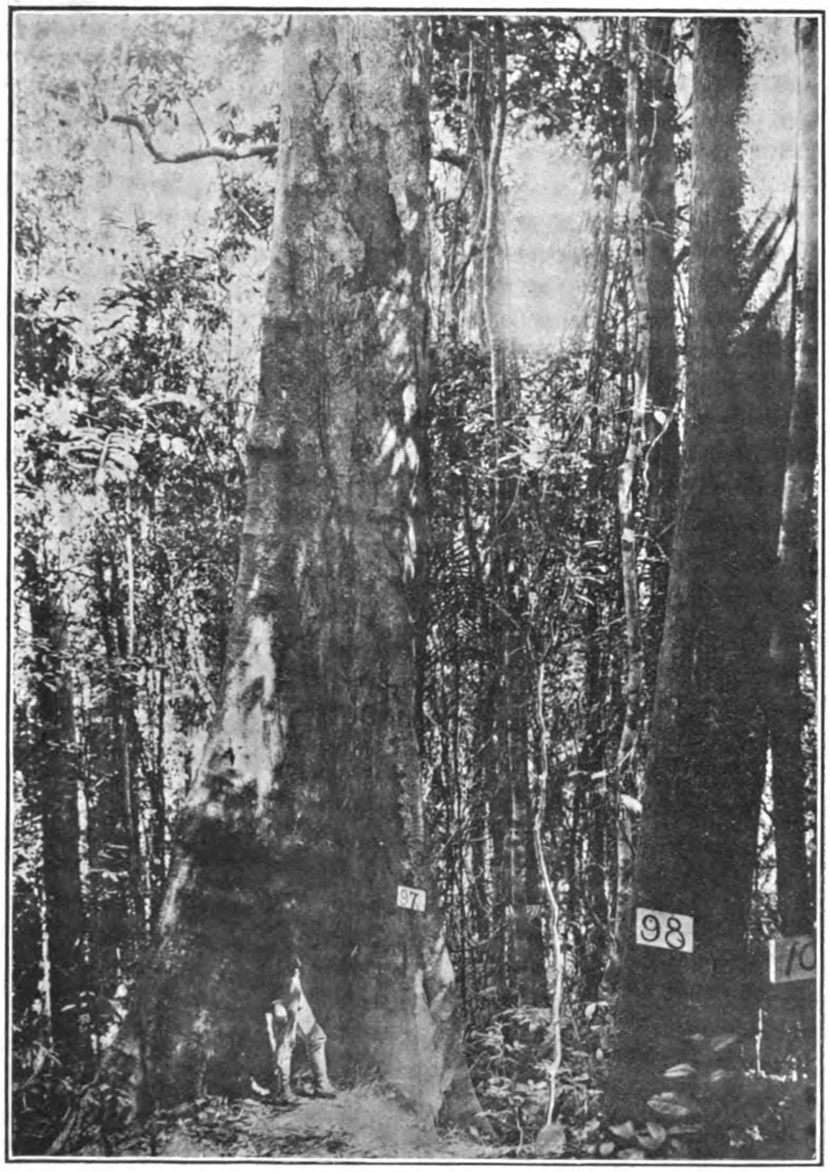
"I myself heard the captain say that the province abounded in gold veins and that gold was found everywhere. Dirt taken from any part, no matter where, even in the street, if washed, left gold in the bottom of the pan.

"When the Spaniards arrived in these Islands the city of Cebú had a large population and the port was much frequented by ships coming from other islands and from kingdoms in the neighborhood of India to trade for the gold of the mines and diggings of the 'Pintados' as the Visayans were named, placers which were worked existed in the Catanduanes, Masbate, Bohol, and Butuan, and the product was sold in Cebú.

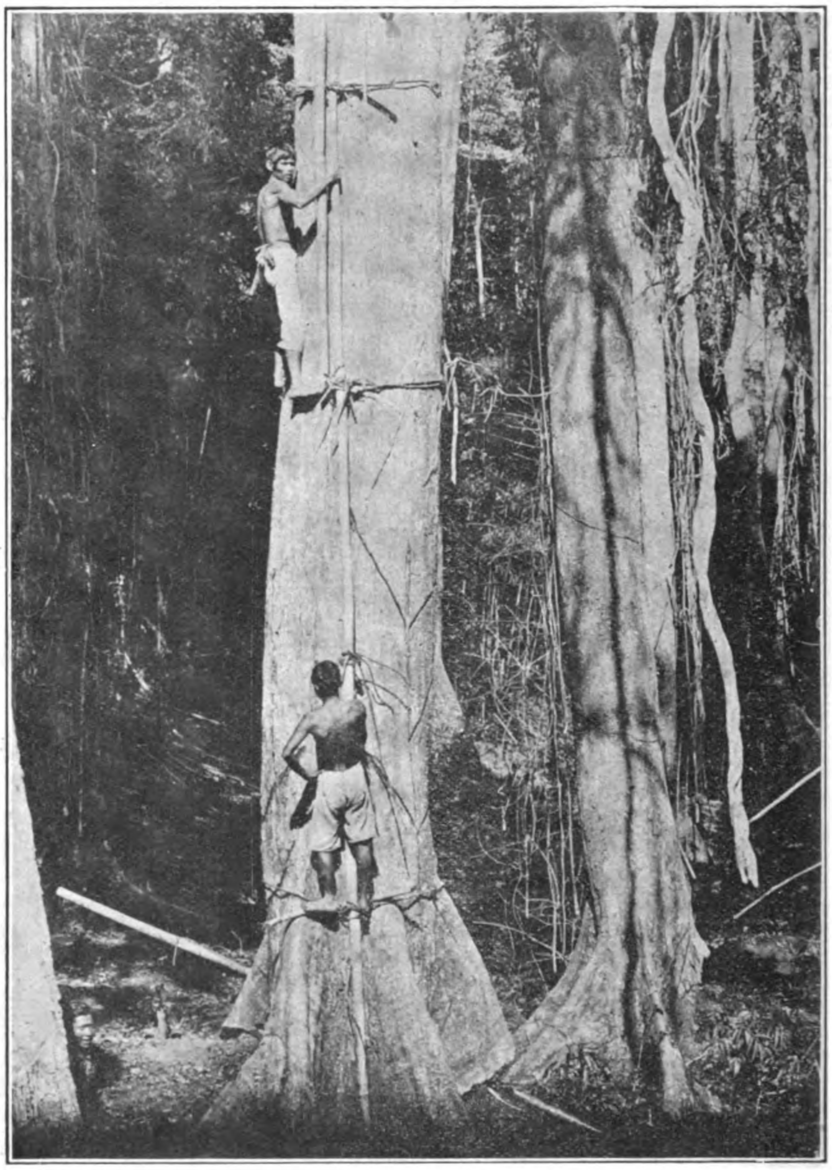
"The richest mines seem to have been those of Butuan. The chief told our fathers (Jesuits), when they went there to preach the gospel, that the first Spanish captain to whose care the Indians were entrusted in that locality, after collecting his tribute told Silongan's (the chief) father, then still cacique, that it was necessary to send a sample of the gold as a present to the Captain-General in Manila. The cacique acceded to his wishes and forwarded two hollow bamboo canes, each 17 inches in length and about fifteen inches in circumference. One contained gold dust and the other a kind of gold collar made of rings joined together. Thirty years afterwards when Don Fernando de Silva had this *encomienda* I heard him say that his Indians so as to satisfy their tribute had hardly to work a week, for such was the abundance of gold in the Butuan River that any Indian who felt inclined to work could easily wash in a day at least one dollar's worth of gold. One of our fathers states that in another river of the Visayans, he was one day examining stones to see if they could be used for building, and broke some of the smaller ones in pieces, he found in them specks of gold in such an abundance that his Indian servant gathered in less than half an hour gold dust to the value of more than fifty cents. This proves the abundance of the precious metal throughout the country. It is a pity that notwithstanding the impulse given by several governors, the mines have never been worked on any adequate scale, and whenever this was tried it was always a failure."

On page 160 of his work, the same historian says: "During the government of D. Alonzo Fajardo, D. Francisco Careño, Governor of the Provinces of Pangasinan and Ilocos, made in 1623 an expedition to the mountains of those provinces for the purpose of subduing the Igorrotes and discovering their gold mines, but the expedition was an absolute failure.

(Continued on page 17.)



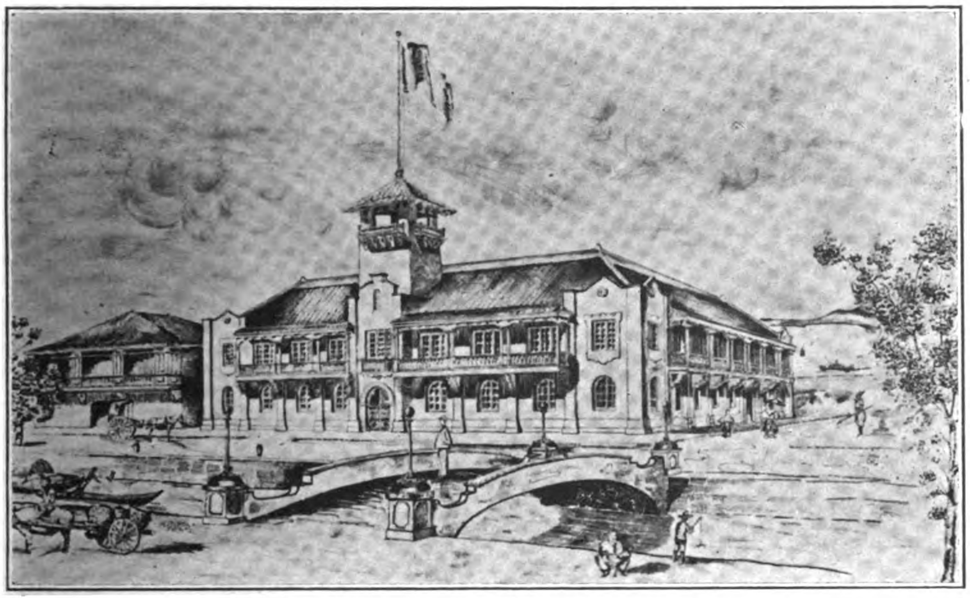
LAMAO FOREST RESERVE.—METHOD OF MARKING TREES ON THE TYPE AREA



LAMAO FOREST RESERVE.—METHOD OF CLIMBING VERY LARGE AND HIGH TREES IN COLLECTING BOTANICAL MATERIAL. PALAC PALAC *(Palaquium latifolium* BLANCO.)

GOVERNMENT BUILDING FOR THE MORO PROVINCE, ZAMBOANGA, P. I.

The Moro Province of the Philippines has commenced the erection at its capital city, Zamboanga, Island of Mindanao, of a unique provincial building, the style of architecture of which combines the Spanish Renaissance with the local style to suit conditions. The plans have been prepared by the Insular



ELEVATION OF THE PROVINCIAL BUILDING.

Bureau of Architecture and the construction of the building is under the supervision of Mr. C. F. Vance, C. E., assistant engineer of the province.

The structure is the shape of an L fronting on two streets, 140 ft. 4 in. on one and 115 ft. 11 in. on the other, covering a total area of 11,284 sq. ft. There is an entrance to the building on both streets, fitted with ornamental iron gate, the entrance floors being paved with granite flagstones. The walls and ceilings are laid off in panels of polished hardwood.

The first floor will be occupied by the provincial treasurer's offices, the post office, municipal offices and storeroom and toilet. The treasurer's office will be divided into a public lobby, separated from the general workroom with a counter and light iron grill; cashier's office, auditor's office, treasurer's office, and a large vault constructed of steel and concrete.

The municipal offices will be divided into a public lobby separated from the general work room and office of the registrar of deeds with counters and light iron grills. There will be a concrete vault in this department for the filing of deed and other valuable papers. All floor space sccupied by the public will be of white cement tile and all other spaces will have a concrete floor with sleepers imbedded in same and covered with polished hardwood boards.

The second floor is built with an overhanging balcony supported on ornamental brackets which furnishes shade and keeps the glaring sun rays from shining directly in the offices. This floor is planned with all offices opening into a spacious corridor which is very essential in a public building of this character. The second floor will be occupied by the Governor of the Moro Province, his secretary and clerks; the Governor of Zamboanga, his secretary and clerks; the court room with a judges' room and consultation room of this, and office for the court clerks and notary; office of the attorney and office for the attorney's clerks; engineer of the Moro Province with his draughting room, etc.; superintendent of schools, storeroom and toilets. The construction will be of the hardwood timbers with foundation and walls constructed of concrete; roof of tile.

The building will be wired for electric lights throughout. The plumbing system will be supplied with water from an artesian well. The water will be pumped from the well to large reserve tanks with a Rider Ericsson hot air engine.

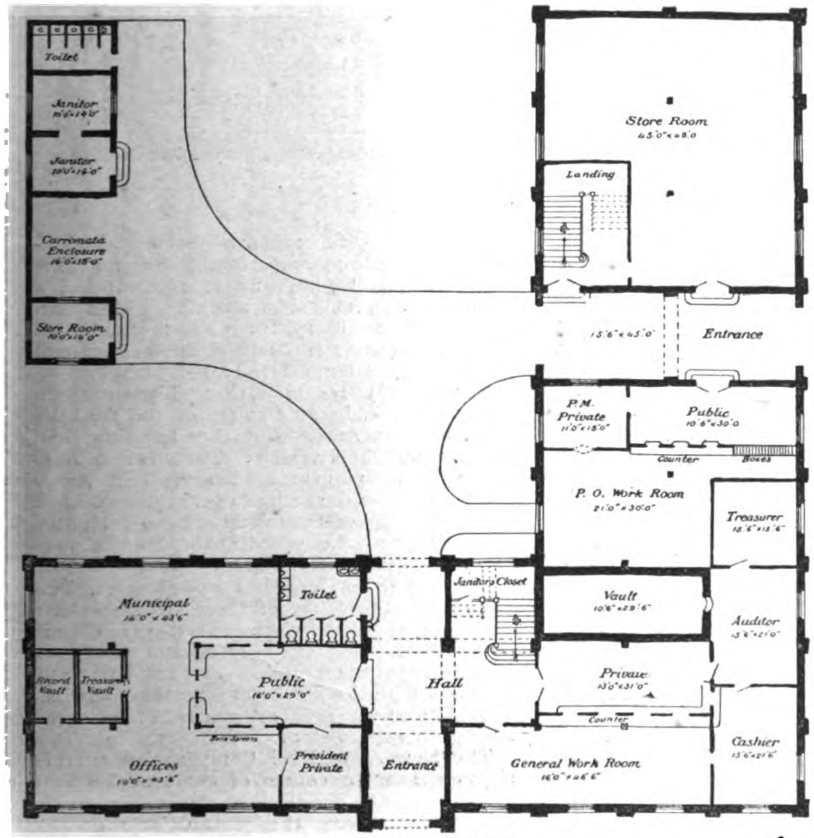
NEW PALACE HOTEL, SHANGHAI

MESSRS. SCOTT & CARTER, ARCHITECTS.

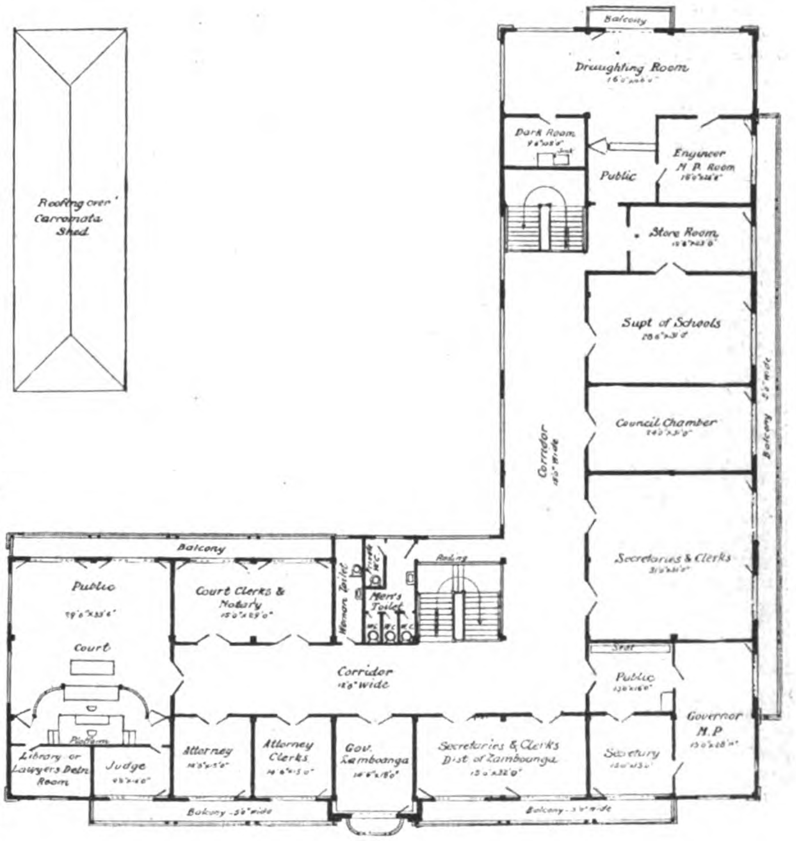
The new Palace Hotel, Shanghai, which is now in course of construction on an admirable site at the corner of The Bund and Nanking-road, when complete, will be the largest building in that Settlement. Externally it will be very handsome and imposing, and internally no effort is being spared to render it comfortable in the truest sense of the word. Mr. Wong Fan Ki is the general contractor and the building is being erected from the designs and under the personal supervision of Messrs. Scott & Carter, well-known and enterprising architects of Shanghai.

The Palace Hotel is being built in the Victorian Renaissance style of architecture, freely treated on account of local conditions and materials, and by a judicious choice of the latter a strong note of color runs through the whole scheme. The site is one of the best in Shanghai, covering an area of 3¼ *mow* with

(Continued on page 15.)

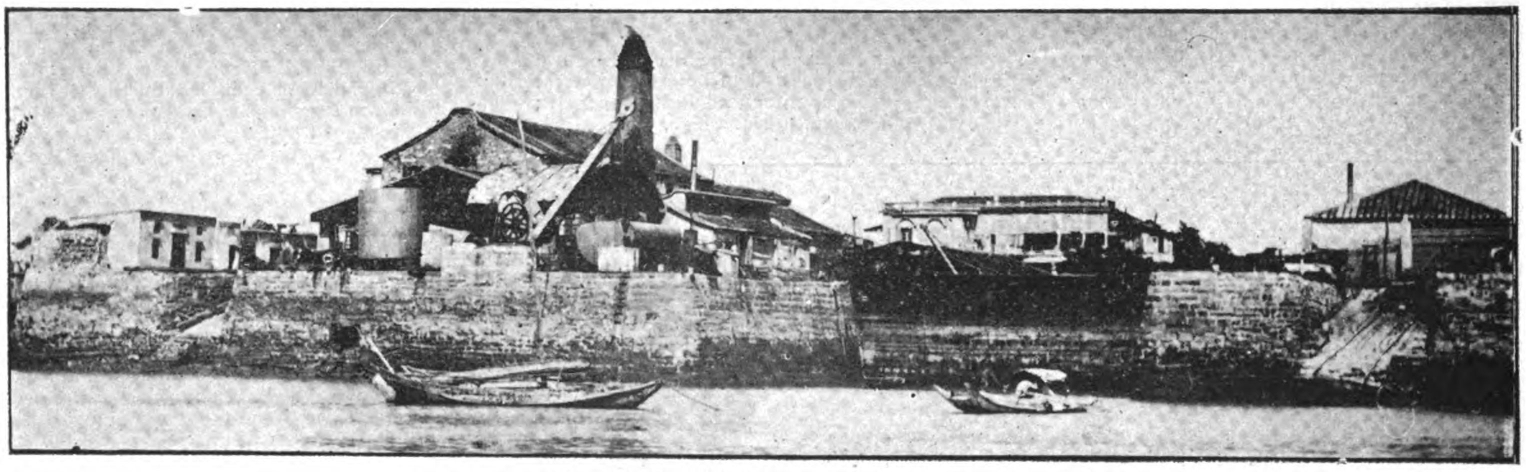


FIRST FLOOR PLAN



SECOND FLOOR PLAN.

PLANT OF THE NEW AMOY DOCK COMPANY, LIMITED

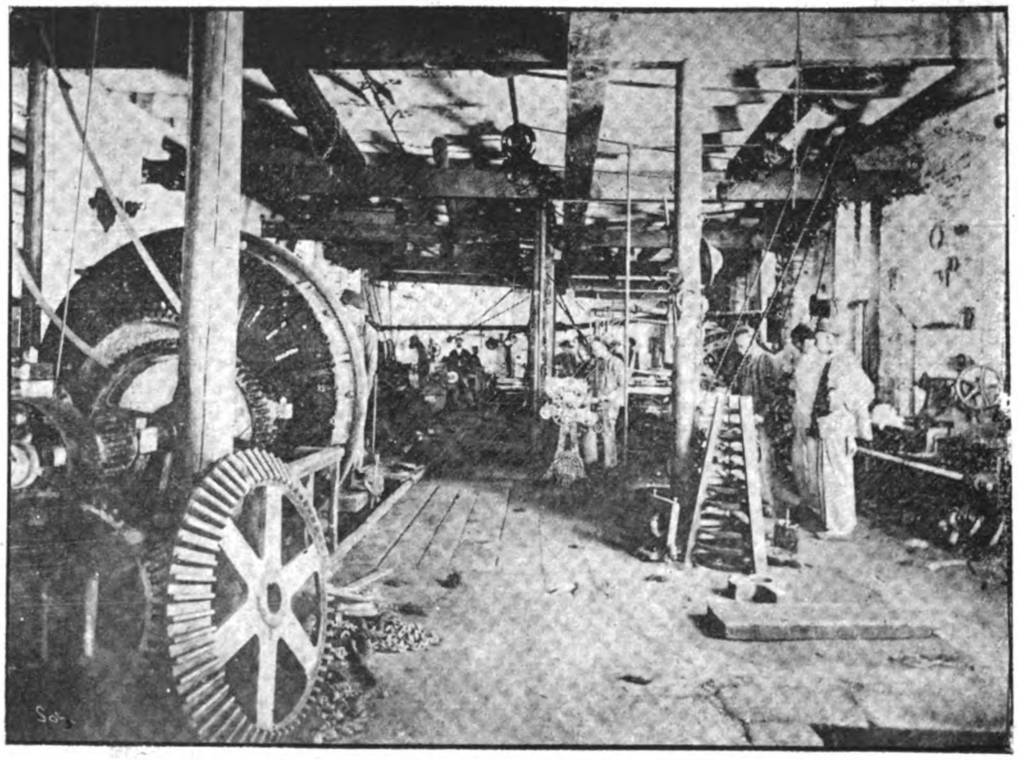


GENERAL VIEW OF THE NEW AMOY DOCK COMPANY'S PROPERTY.

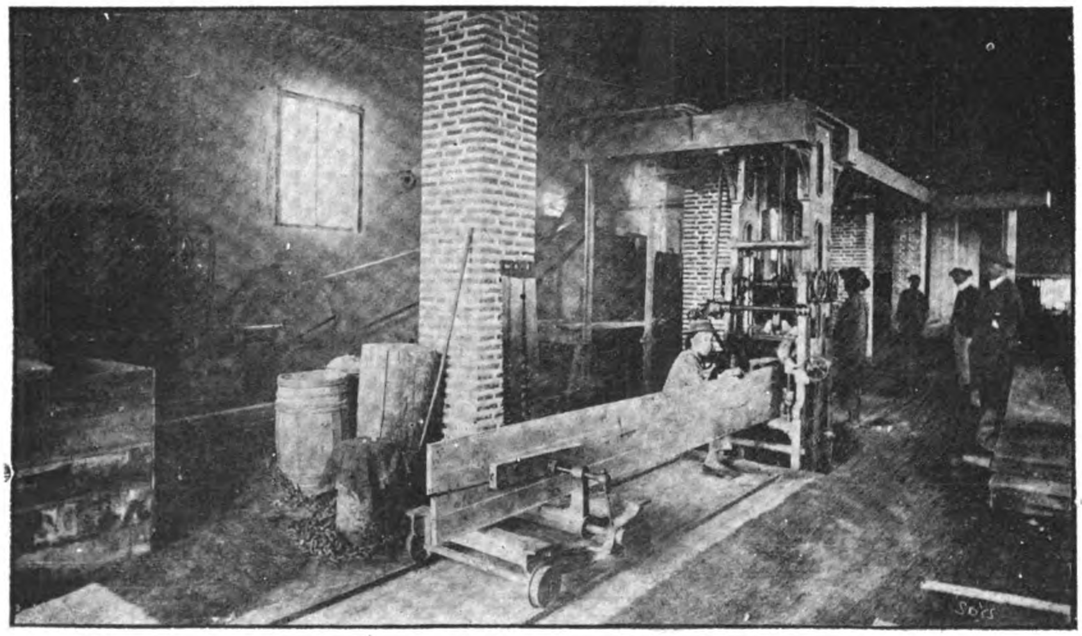
As far back as the year 1860, Amoy already possessed a fine granite drydock, with a water frontage of about 400 ft. The establishment has suitable fitting shop, smithy, foundry and boiler and carpenter sheds, all fitted with useful machines driven by steam power. Few people, however, beyond the regular coasters who patronized this establishment, knew of its existence and docking facilities.

The Amoy Dock, it can be said, only came into prominence when its present owner, The New Amoy Company, Ltd., bought over the property as a going concern from its former owners, in the year 1892. Under this new régime a signal change was noticeable.

The dock, a tidal one, has been lengthened to 360 ft. and can now receive vessels up to 330 ft. between perpendiculars, 40 ft. beam and of a mean draft of 16 ft. during Springs and 12 ft. during Neaps. Steamers were then (1892) steadily superseding sailing vessels in the China coasting trade, and the passenger traffic with the Straits Settlements, increasing yearly, more and larger boats were placed on this line. All these changes the new concern was not slow in noticing and to enable it to keep pace with the times, has increased its plant year by year with new up-to-date machines placing it at the present in a position to turn out work cheaper and with quicker dispatch than it ever was capable of in former times. Among the company's new acquisitions are some very fine modern machines, including a plate-bending and straightening machine which will roll plates up to 18 ft. 6 in., a punching and shearing machine which can shear and punch 1¼-in. plates; also some very fine lathes, the largest one being equal to taking the biggest tail shaft.



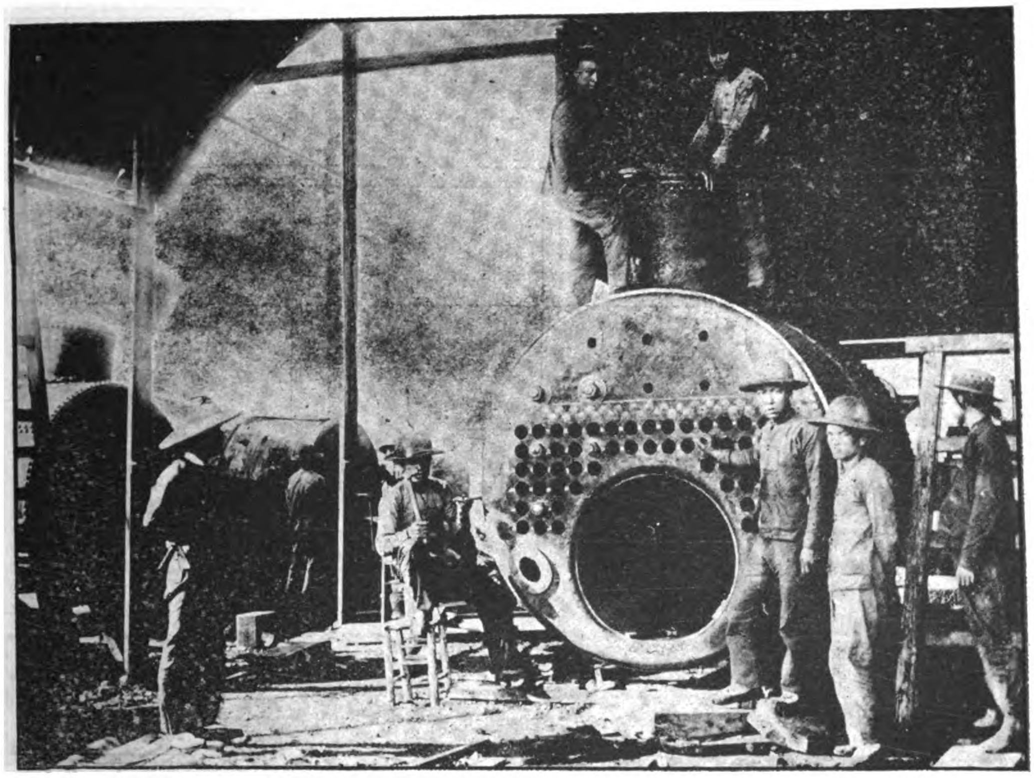
ONE OF THE MACHINE SHOPS.



ANOTHER SECTION OF THE MECHANICAL DEPARTMENT.

It was only recently that shipowners in the Philippines became aware of the facilities obtainable at Amoy for the docking and repairing of their vessels. The steamer *Bun-uan* was the pioneer craft to call at Amoy for docking and general overhaulings. She was soon followed by several others, including steamers from the well-known Manila concerns, Compañia General de Tabacos de Filipinas, Compañia Maritima and Messrs. Luis Hidalgo & Co. Some of these steamers have had very extensive works executed and from inquiries the fact has been elicited that they were all very creditably and satisfactorily done. All works are being executed by first-class Cantonese artisans under experienced European supervision.

The New Amoy Dock Company has another slipway now in course of construction. It is situated to the left of the Amoy Dock, but unfortunately the picture of the dock herewith presented does not cover this improvement. When completed this slip will be able to take up vessels of from 250 to 300



A SECTION OF THE BOILER SHOPS.

tons. The photographs also fail to show the company's smithy with its steam hammer, foundry with its large cupolas, etc., and the large boiler shed where all the principal boiler-making plant is erected.

The much-talked-of railway between Amoy and Foochow, with its attendant benefits, viz the opening up of the coal and iron mines in the interior, have lately shown every semblance of becoming a reality in China's development. This, coupled with the much-desired peace which must soon reign again in the East, thereby reviving the somewhat paralyzed trade between Amoy and the North, will contribute a great deal to the future prosperity of this company.

NEW PALACE HOTEL, SHANGHAI

(Concluded from page 13).

a frontage to the Malloo of about 290 ft. The building will be the highest in Shanghai, having six stories, 90 ft. from pavement to eaves, with cellar under, and a roof-garden over the southwest portion.

On the ground floor the hotel will contain a commodious and well-lighted entrance hall leading from Nanking-road, a staircase with two passenger elevators, billiard room, buffet, etc., all tastefully paneled in teak to varying heights from 4 ft. 3 in. to 8 ft. 9 in. This floor will also include six storerooms separate from the hotel.

On the upper floors there will be 110 bed and bath rooms attached, with every modern convenience, and on the top floor, in addition to the spacious and well-lighted dining room, 63 by 48 ft., provision has been made for private dining rooms, buffet, ladies' parlor and a well-balanced scheme of kitchen and service arrangements.

Ample provisions have been made to guard against fire. In addition to the main and service staircases, four iron escape staircases are being constructed between the various floors on the south side of the building, and two Grinnell patent fireproof cutoff doors are provided on each floor. Hydrants and other fire-extinguishing appliances are also to be utilized on the different floors. In addition to the ordinary open fire-places, hot water heating will be adopted for the halls, corridors and other places where heating is necessary.

On account of the needs and requirements of the present (Central) hotel, the new building is being built in two parts and it is expected that it will take about four years before the whole scheme is finally completed.

PALACE HOTEL, SHANGHAI, IN COURSE OF CONSTRUCTION.

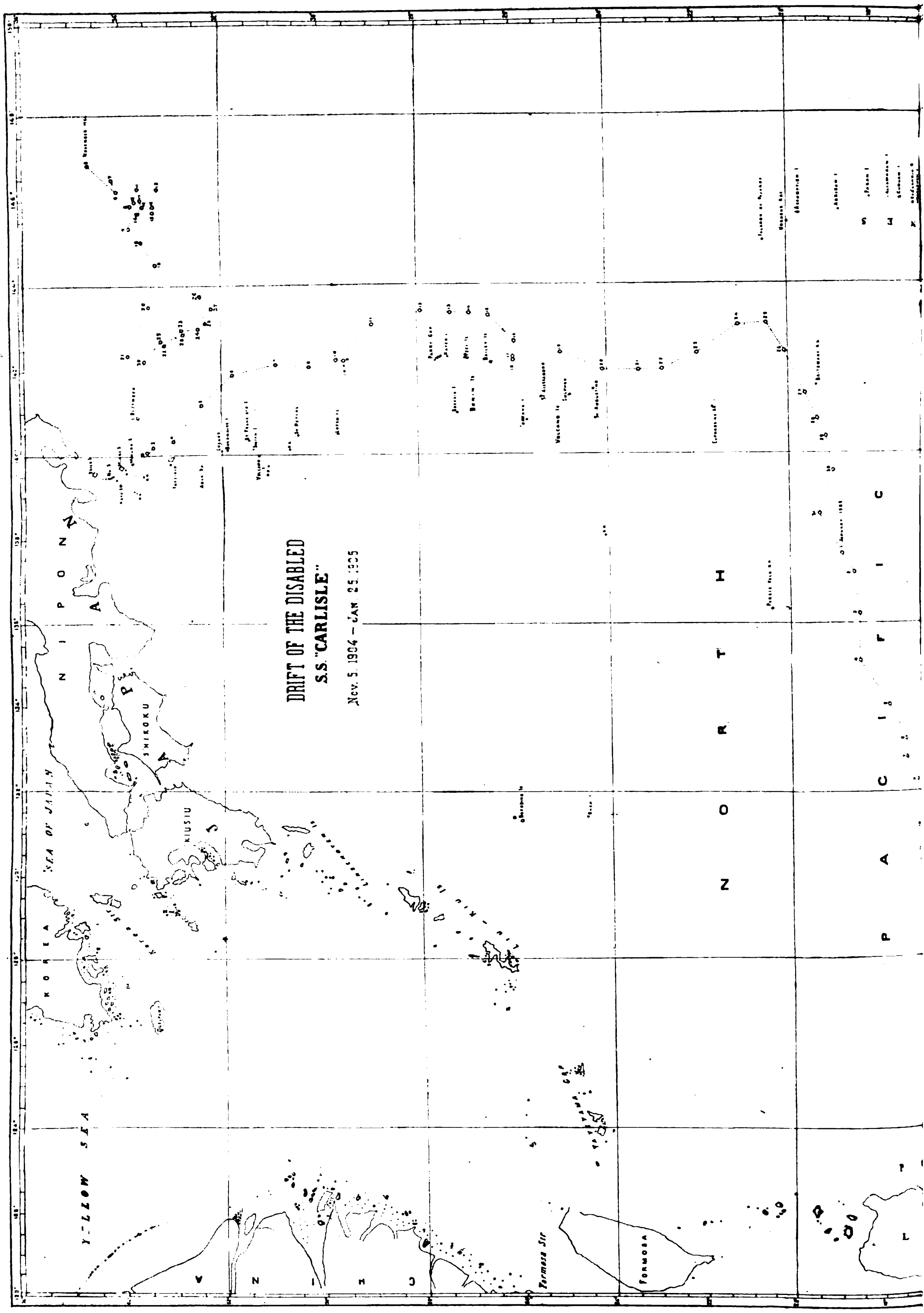
AIR CURRENTS OF THE NORTH PACIFIC OCEAN

The Rev. José Algué, S. J., Director of the Philippine Weather Bureau, Manila, has just published a bulletin in which the drift of the disabled steamer *Carlisle*, from November 5th, 1904, to January 25rd, 1905, is detailed in a chart furnished to the reverend gentleman by Captain Simpson, master of the vessel. It might be recalled that the *Carlisle* left Vladivostock with a cargo of high explosives originally intended for the Russian warships at Port Arthur, under bounty contract with the St. Petersburg Government. The vessel became disabled E. of the NE. coast of Nippon, and it was from that point that she took up her long and probably unprecedented drift in Asiatic waters. Her case is all the more remarkable from the fact that she was not spoken by other craft during the period of her helplessness at sea nor discovered by the numerous Japanese warships which were scouring the waters in which she was casting about at the mercy of wave and wind. Her drift ended in the Bay of San Miguel, Island of Luzon, and from there she was towed to Manila, where she underwent repairs. The *Carlisle* finally succeeded in delivering her cargo to the Baltic Fleet in Indo-China waters.

In view of the interest which the case aroused in maritime circles of the Orient, THE FAR EASTERN REVIEW produces herewith the chart which Father Algué attaches so much importance to as meteorological data.

The course of the disabled steamer in its long wanderings affords mariners in these waters an excellent opportunity for studying the air currents in an important part of the Pacific Ocean, namely, the zone embraced by Japan on the N., the Mariana Islands on the E., and the Philippine Islands on the W. On November 5th the ship stood near the 35th parallel of North latitude, in longitude 147° E. of Greenwich, and on January 23rd, 1905, she anchored in San Miguel Bay, which is in latitude 14° N. and longitude 123° E. The course of the steamer during November confirms the published observations of the Philippine Weather Bureau for that month relative to the different periods of high and low pressure. Thus, on November 6th and 7th, while a low area ran along to the N. of Hondo Island, the ship was dragged from WSW. to ENE. From the 8th to the 17th variable winds kept her inside the space of one square degree, and during this period several centers of depression moved upon Japan from different directions. On the 17th and 18th she was driven by strong E. winds, the effect probably of the typhoon which crossed the Philippine Islands from November 16th to 19th. From the 19th to the 21st the winds were still quite strong from the E., under the influence, probably, of the low area which then lay to the E. of Balingtang Channel. On the 21st and 22d they blew hard from the NNW, and this corresponds with the severe monsoon observed at that time in the Formosa Channel and the North China Sea by the Philippine Weather Bureau. Finally, the remarkable increase in the force of the E. winds at the end of the month confirms both the existence of a low area to the E. of Balingtang Channel and the strengthening of the monsoon on the E. of Formosa and the Liukiu Islands.

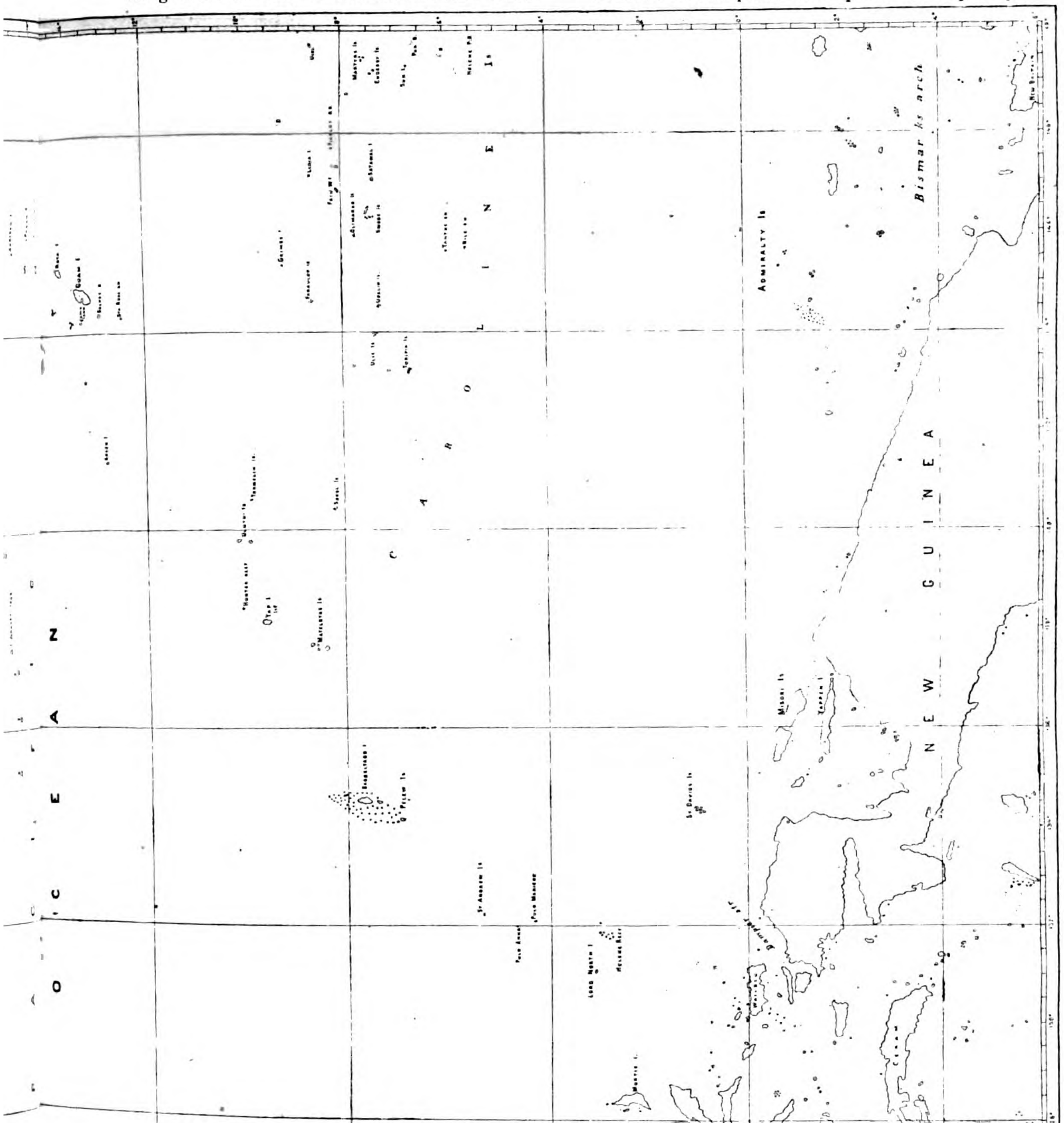
With regard to the prevailing winds of December in the region traversed by the *Carlisle*, it will be noticed that the wind blew ENE. on the 1st and light from the SE. on the 2d. From December 3d to 25th, with very few exceptions, the prevailing winds were from NE. to N., and for the rest of the month from NE. to ESE. The stronger currents were from the 4th to the 9th, NW. to NNW., and Father Algué believes these were indications of the depression which began to be felt in the E. of the Philippine Islands December 10th. The weather charts of Japan point out a center of depression, quite deep, to the NE. of Yezo Island on the 9th, and that was the very day on which the *Carlisle* was driven from S. to N.—the only N. movement it had during the month. On the 10th the currents from the NW. and NNW. increased in strength and remained thus until the 12th. From the 12th to the 15th light winds blew from the N.; on the 15th they came from the NE.; on the 16th from the E., moderate; and on the 17th and 18th from the same direction, but very light. The currents from December 18th to 24th were in close relation with the first depression of the third period, which has already been spoken of in this account. After the 24th the currents were generally E., strong on the 26th and 27th and on the 30th and 31st.



BULLET-PROOF COAT

A trial took place lately of a bullet-proof coat and an impervious shield invented by Messrs. T. Nakanishi and T. Ascano, engineers in the employ of Mr. C. Mitsui, gun and ammunition dealer, Tokyo. Both breastplate and

movable shield were tried. They each consisted of a couple of thin steel plates each 2 millimetres thick, but separated by a stuffing of a substance suggestive of snakegourd fibre stiffened with tar or asphaltum—the whole presenting a thickness of about 3 inches and being covered with a thin flannel-like cloth. The weight of the breast-plate is a fraction over 10 lbs.; the weight of the shield must, of course, differ according to its size. The trials were made on ranges of 100 meters, 75 meters, and 28 meters, the actual proofs consisting of two rounds at each distance, the rifle being that in use by the Japanese armies firing a projectile of 7 mill. diameter. At 100 and 75 metres the bullets penetrated the first plate, and, piercing the stuffing, went to pieces on the second or inner plate. At 24 metres matters were little better except that the inner plate was forced inwards and rendered concave at the point of impact. The quality of the armour was much applauded, but the weight was demurred to. Even the inventors admitted that the coat could not well be carried by infantry, and that the chief purpose of both coat and shield is to protect engineers and prisoners in cutting wire entanglements and removing other obstructions.



CAMARINES (P. I.) GOLD FIELDS

(Concluded from page 12.)

After penetrating the mountains for seven days, on the eighth day it was ambushed, the commander killed and the troops and Indian auxiliaries put to flight. In 1634, D. Alonzo Martin Quirantes took command, and after hard fighting reached the place where Valdez had met his death the year before, but as at that time the Captain-General died, the troops were recalled and in consequence all the results accomplished lost."

Antonio Pigafeto, in his narrative, speaking of gold in the Butuan River, Mindanao, says: "In this place exists so much gold that nuggets are found in the crevices of the rocks the size of walnuts. All the king's utensils are made of gold. He has two large, heavy gold earrings, and the handles of the weapons are generally of gold." Forty years after Pigafeto's visit when Butuan was conquered, the Spaniards found large quantities of gold not only in the crevices of the rocks, but also in the bottom of streams and rivers.

During the governorship of Don Pedro Manuel de Arandia, a Spanish gentleman, Don Francisco de Estorga, obtained a concession to work mines in the Paracale district. He opened five new veins, the "San Nicolas de Tolendino" in the Lipa mountains, "Nuestra Señora de la Soledad" in the Debojan mountains, "San Francisco" in the township of San Antonio, "Las Animas" en Lipara, y "Nuestra Señora de los Dolores" in the Minapa mountains; all close to the village of Mambuao. But due to legal difficulties, lack of machinery and experienced miners he had to abandon the enterprise.

As late as 1893 a company called "The Philippine Mineral Syndicate" was formed in London, England, to work also the Mambulao mines, but, for some reason or another, does neither seem to have succeeded.

What black spell is it which hangs over the Paracale mines?

IMPROVEMENTS IN THE PHILIPPINES.

STREET IMPROVEMENT IN ERMITA, MANILA.—The Municipal Board has finally purchased all the land necessary for the widening of Calle Nueva, Ermita, Manila, from Calle Herran to Calle San Luis.

HIGH SCHOOL BUILDING FOR MINDORO.—The Philippine Commission has appropriated -P-350,000 for the erection of school buildings throughout the Islands, of which sum $4,000 have been set aside for the construction of a High School building in the Province of Mindoro.

RAILWAY FOR TARLAC PROVINCE.—The people of the Province of Tarlac, Luzon, are promoting a company whose object will be the construction of a railway in their province It is believed that $200,000 will be sufficient capital to carry out the project, and that sum is being subscribed.

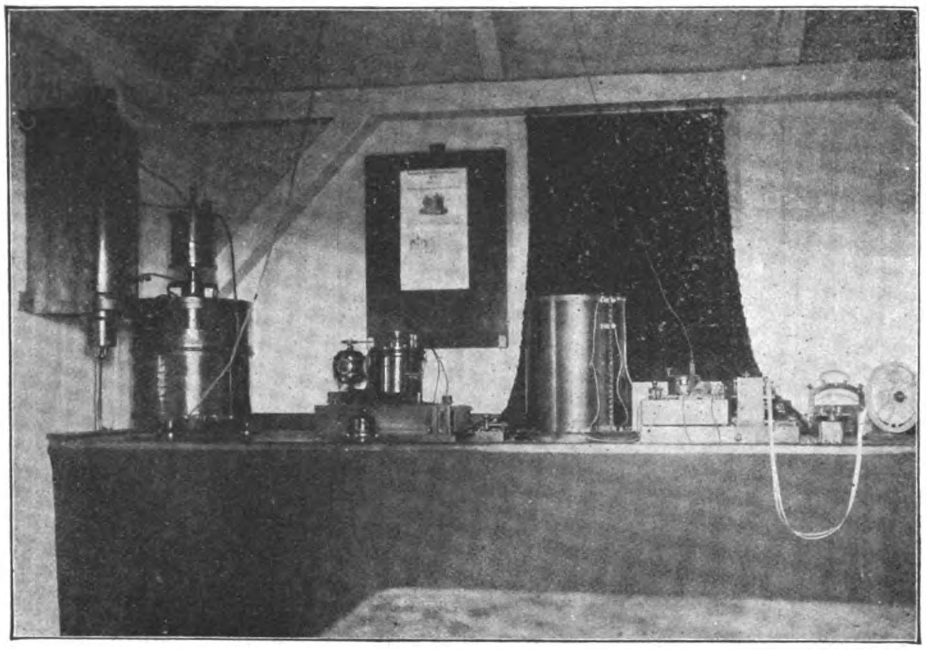
NEW TELEPHONE SYSTEM, MANILA.—The Pacific States Telephone and Telegraph Company of San Francisco, Cal., through its representatives, Messrs. Sabin and Glass, has accepted the franchise offered to it by the Philippine Commission for the installation of a modern and complete telephone system in the city of Manila. The Company is filling a bond of $500,000 for the faithful performance of its contract.

WATER AND SEWER SYSTEM, MANILA.—The Municipal Board of Manila has approved the plans submitted by Mr. James F. Case, Chief Engineer, for the new water and sewer system of Manila. The total cost of this improvement is estimated at $4,000,000 gold, which sum is being provided for through the issue of bonds, and the first series representing $1,000,000 gold is being floated in New York City at the present time.

PASIG RIVER WALLS MANILA.—With reference to the letting of the contract for the repairs to the Pasig River walls, Manila, to the Atlantic, Gulf & Pacific Company, and the apparent large variance between the company's first and second bid, the latter resulted from uncertainty in the specifications governing the quantities of excavated material for which the contracting company would be paid. Its first bid amounted to $168,000 gold, its second bid to $157,868, in round numbers The City Engineer's calculation of the bid amounting to $180,000 or $190,000, as published in the Manila papers, was, according to the Atlantic, Gulf & Pacific people, very deceptive and erroneous. The apparent difference as estimated between the company's first and second bids, by the City Engineer's office, was the result of uncertainty and misunderstanding as to the total yardage of excavated material for which payment would be made by the Municipality of Manila. This explanation is not intended to reflect in any manner on the methods of the City Engineer, but only to set aright any wrong impression the first figures might have made that the Atlantic, Gulf & Pacific Company has undertaken a contract at a financial loss to itself.

WIRELESS TELEGRAPHY: THE "TELEFUNKEN" SYSTEM

The "Telefunken" system of wireless telegraphy arose out of the amalgamation, in the summer of 1903, of two systems known respectively as the "Braun-Siemens" and "Slaby-Arco," the one being exploited by the "Gesellschaft für drahtlose Telegraphie Prof. Braun und Siemens & Halske" and the other produced. The "Telefunken" company, in a pamphlet on its system, makes the following interesting remarks on the possibilities of wireless telegraphy:—



"TELEFUNKEN" SYSTEM, LLOYD HALL STATION, BREMERHAVEN, INSTALLED IN 1901.

by the "Allgemeinen Electricitatsgesellschaft." The simple name of "Telefunken" was selected as the title of the combined systems.

The new company commands extensive technical means resulting from the combined experience and designs of the two component systems and a vast number of devices patented in almost all civilized countries; each of the two systems having possessed, at the time of the amalgamation, upwards of 20 patents in Germany alone. These patents covered both the methods of mounting and of construction. One of the principal patents is the transmitter arrangement, in which an oscillation circuit, consisting of Leyden jars and a spark-gap containing large amounts of energy, excites the aerial conductor to slightly damped self-oscillations. The patent for this device was secured from Germany ("on principle") in 1898, two years before the Marconi Company in England began to employ the same arrangement. A similar device for the receiver was patented January 1st, 1901. It consists of a closed Resonance Oscillating Circuit which, by a clear and pronounced self-period, renders the receiving system sensitive to a definite transmitter frequency only and thus easily eliminates disturbances emanating from foreign transmitters; while the receiver system becomes adapted for taking up the whole energy radiating from the transmitter with jar excitation.

Apart from a patent which reserves the resonance of the four oscillating circuits of transmitter and receiver for certain modes of mounting, the company has obtained some patents and applied for others on transmitter arrangements for reducing loss by damping in the spark-gap. Owing to Wein's well-known publications in the "Annalen der Physik," the company was unable to obtain any general patent on the loose coupling of receivers; though patents were secured on a number of special parts by the employment of which it becomes possible to syntonize with great accuracy without any loss of intensity or reduction of distance, and also an electrolytic wave-detector which is claimed to be the simplest and most reliable receiver yet

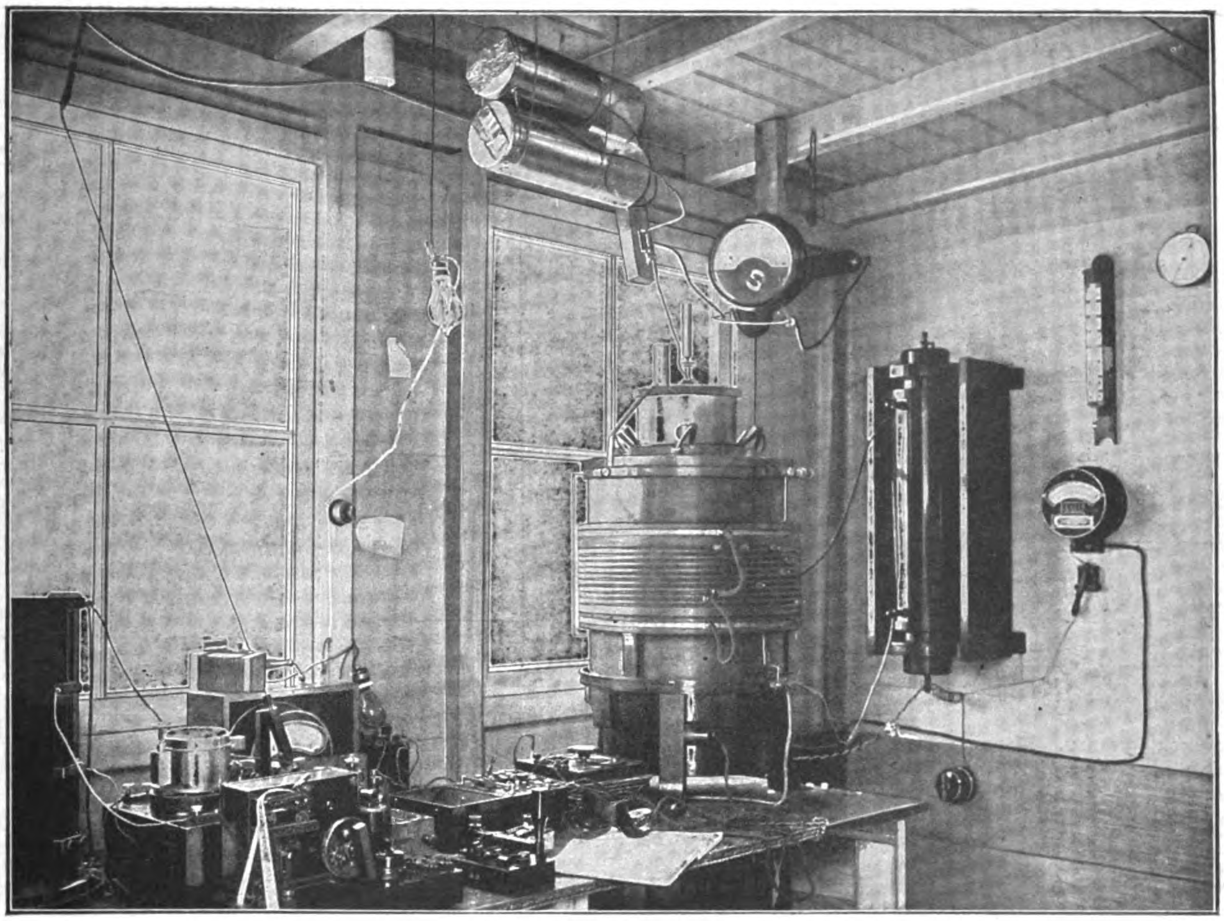
"Considering the indiscriminating reports of a 'puffing' character that have been circulated as to gigantic results obtained by wireless telegraphy, it will not appear out of place if we state clearly what, the present day, this means of communication is capable of doing, and especially what we ourselves can guarantee as regards our installations.

"The distance which reports may be transmitted by wireless telegraphy is essentially determined by the size of the aerial-conductor net used for the radiation and reception of the electric waves, the extreme dimensions being those of a funnel arrangement swung between towers 60 metres or more in height. The larger these nets, the greater the *source* required to supply them with the electric energy necessary for radiation. A definite standard cannot be set up, one system telegraphing 100 km., another 1000 km. With like mastery of the technicalities of electric oscillation, the distance achieved is rather a mere question of the size of the station. To compare two systems, it is essential that both operate under like conditions, that is with equal energy.

"As early as 1902, we made successful *experiments* with a *station* of very *large dimensions*, and ever since have continued our efforts in this direction in order to obtain a basis for large projects.

"In our great experimental station at the Engine-House of the General Electric Company's Oberspree Works in Oberschöneweide, 14 km. from Berlin, four chimney-stacks, each 70 metres high, support a square net consisting of about 100 aerial wires and running downwards in the form of a funnel. From the said engine-house an alternating current of about 15 kilowatts is drawn. This current, converted into about 50000 volts, supplies an exciting system of about 2 mf. By the enormous oscillations of this system which, on discharging, are produced with a frequency of 900000 per second, the aerial net is excited. The first overland experiments were made in spring, messages being forwarded to the German Marine Funkspruch-station at Marienleuchte on the north coast of the Isle of Fehmarn 275 km. away, and unexceptionable transmissions being obtained with masts only 35 m. high at the receiving station and with only 2 kilowatts at the emitting station. The receiving capacity (energy) having been augmented to about fivefold by the reconstruction of the station, experiments were made with increased distances. On the very first day of these trials, easily legible telegrams were forwarded to Karlskrona in Sweden, a distance of 450 km., and this notwithstanding the fact that receiving wires only 35 m. in height were used. The maximum carrying distance of the station was, of course, far from being attained. Moreover, it being of little interest to us, no attempt was made to do so. The main purpose to be served by these experiments is the testing of all special constructions for transformers, exciting circuits, air-wires, etc., at a large station; and this aim has been attained in the experiments hitherto made. We are now in a position to erect, under *gaurantee, communications* covering *a distance of upwards of 1200 km.*

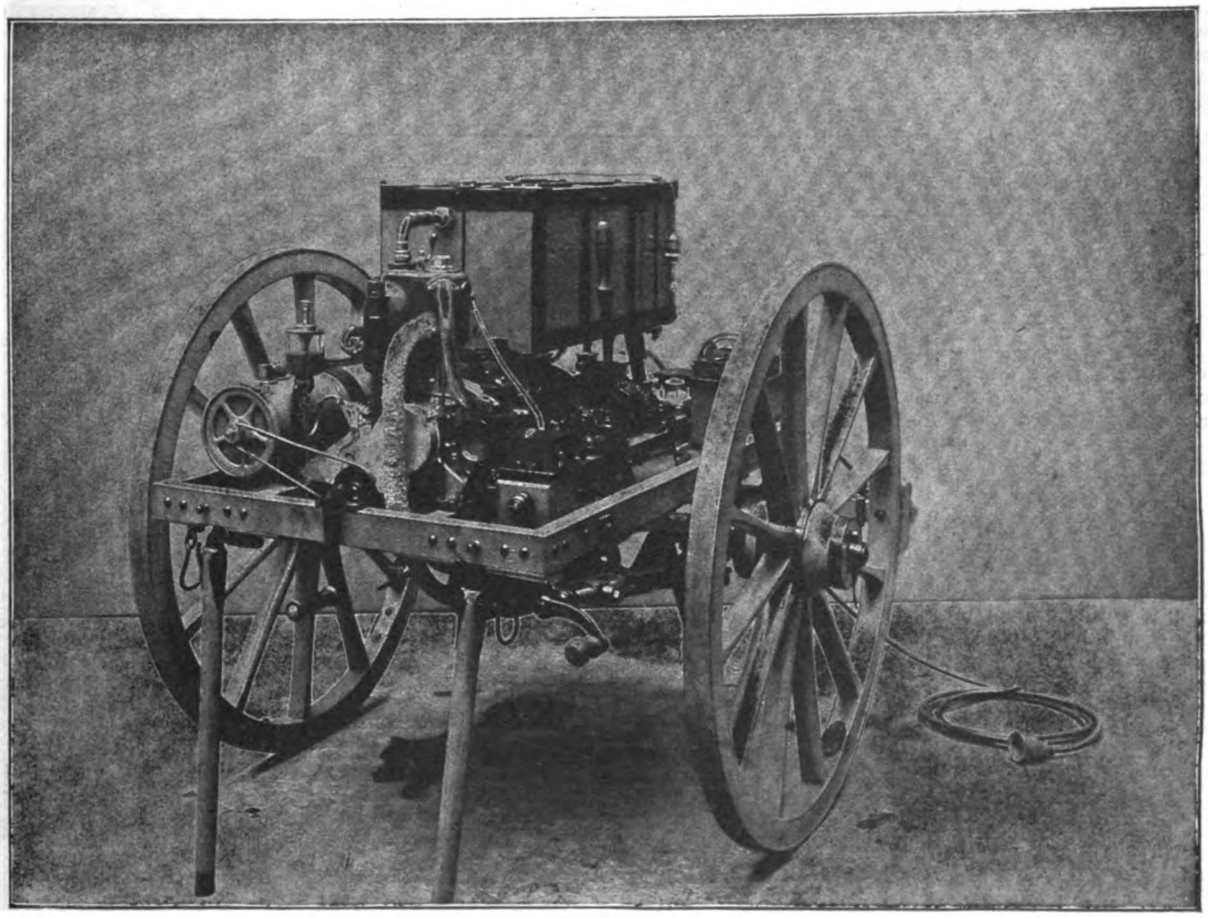
"TELEFUNKEN" RECEIVING APPARATUS FOR PORTABLE STATIONS.



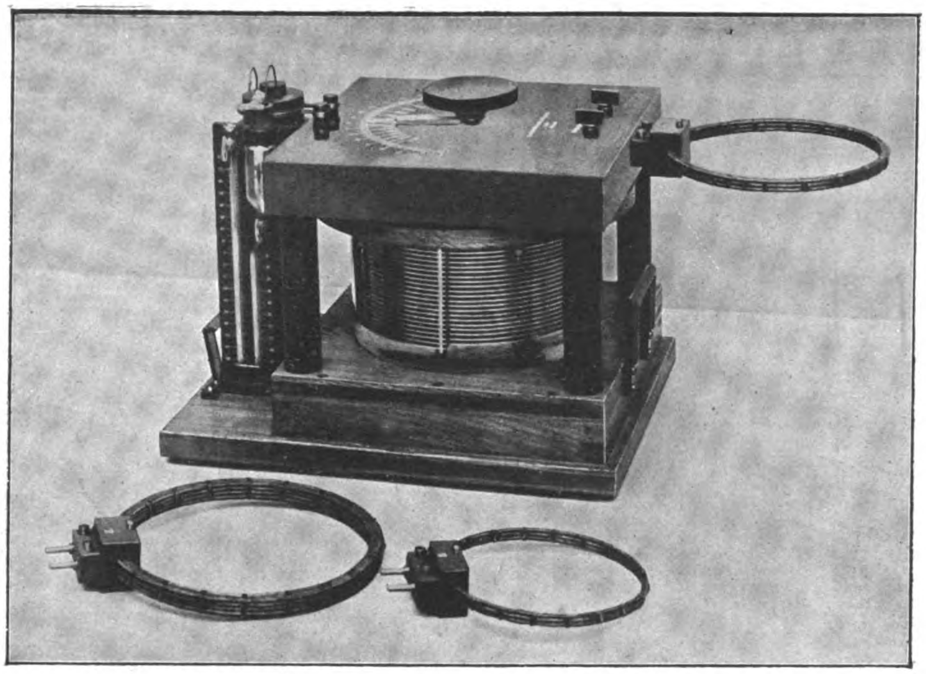
COMPLETE STATION EQUIPMENT FOR SHIPS—RANGE 200-300 KILOMETERS.

"It is a characteristic of wireless telegraphy that the *transmission distance* of two stations *is not constant*, but varies according to the *state of the atmosphere*.

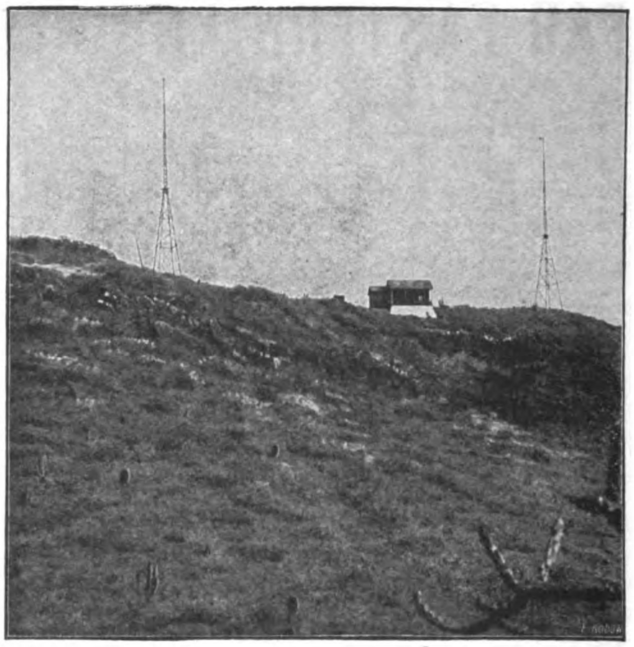
"The distance which electric oscillations will carry depends upon atmospheric conditions. Everyone who has any acquaintance whatever with wireless telegraphy is aware that, especially in summer, the carrying intensity will change, in perhaps a few hours, to such an extent that double or even treble the energy otherwise required to bridge at



PORTABLE STATION: CAR FOR CURRENT SUPPLY. (ANOTHER CAR FOR THE APPARATUS COMPLETES THE OUTFIT).



ONDAMETER, FOR DETERMINING WAVE LENGTHS.

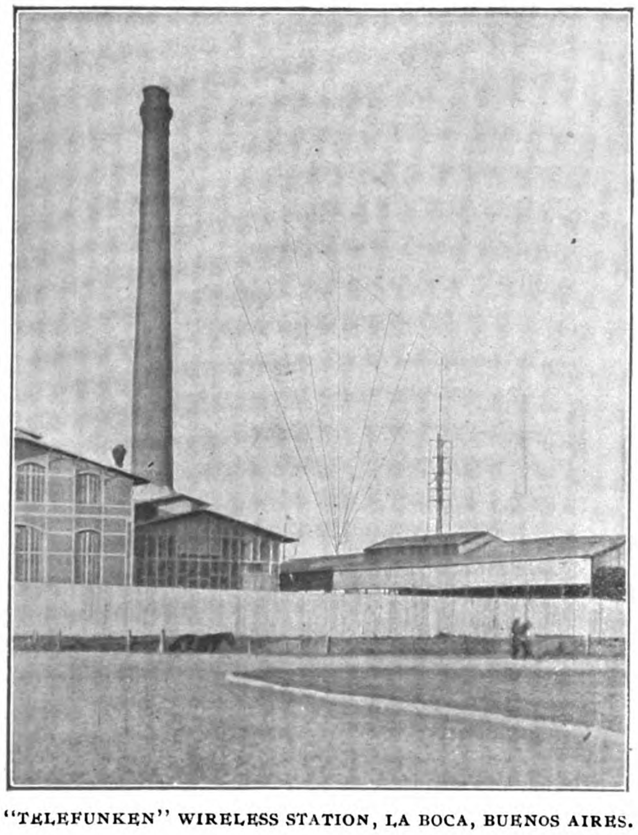


"TELEFUNKEN" WIRELESS STATION, CAPE HARO, MEXICO, INSTALLED DECEMBER, 1902.

given distance will become necessary. Hence, in establishing reliable communication by means of wireless telegraphy, great attention must be paid to the *factor of security* common in technical affairs. For example, if two stations are *at all times* to be able to signal satisfactorily to one another at a distance of 100 km., it is essential that their energy be sufficient to cover a range of about 300 km. under favorable conditions; the stations are then said to work with threefold security. The neglect of these precautionary measures, so universally recognised in other branches of engineering, is the reason why enthusiastic satisfaction with new installations of wireless telegraphy is so often followed by a reaction, and why scepticism is expressed in certain quarters as to the reliability of the stations. The practical value of records is therefore always very doubtful. Our company, having recognised the necessity for the aforesaid precautions, constructs its stations on a considerably larger scale than other concerns. And yet, despite even these ample dimensions, it must be admitted that, under exceptional atmospheric conditions, the transmission of despatches may occasionally suffer interruption. Such disturbances are, however, no more frequent than in telephoning with overhead wires, and last only from a short time before a storm till a short time after it.

"In the newspaper notices characteristic of most of the Wireless Telegraphy systems, there is also much talk of the brilliant successes of their new methods of tuning. It is generally admitted that the tuning-up in these systems is such as to prevent a third party from disturbing or reading messages despatched. All such assertions as to the impossibility of coreading are mere fiction. This has been forcibly demonstrated by Mr. Nevil Maskelyne, the physicist, who, in 1902, intercepted the secret despatches of the Great Transatlantic Station at Poldhu in England and published them in the November number of the Electrician, pp. 166 and 167. In the same way, when the Dutch navy were experimenting at Amsterdam, we were able first to determine the length of the wave used and then to receive the Marconi telegrams of the Broomfield, Station by Chelmsford 340 km. away, that is to say at the same distance as the Marconi Company and despite all their efforts to prevent us from reading.

"In producing distant effects by means of electric waves, as in wireless telegraphy, the energy of undulations is spread equally through space in every direction around the transmitter. Accordingly, whoever makes use of electric waves for telegraphing consigns his despatches to space. And since the whole space in question contains electric oscillations, the consignor—unless he place the space under military control—cannot prevent a third party from catching up the oscillations in conductors and rendering them perceptible by sensitive apparatus, i. e. converting them into signs. Of course, the reading and deciphering of the electric signals may be rendered difficult by all sorts of artifices, such as secret codes, rapid telegraphing, etc.: but the ultimate disclosure of the despatches cannot be prevented. To do this an alteration in the fundamental laws of physics would be necessary.



"TELEFUNKEN" WIRELESS STATION, LA BOCA, BUENOS AIRES.

"The *value of wireless telegraphy to the commercial navy* is quite as striking. Not only is every passenger now enabled to despatch important messages some hours or even days after departure or before arrival, the despatches being delivered weeks earlier than formerly, but, more than this, a ship in distress through storm or fog, collision or other casualty, may be saved, with crew and cargo, by the timely use of wireless telegraphy. The possibility of a ship's despatching messages by wireles telegraphy rises rapidly from year to year. To-day, the shores of the North Sea and the Baltic are netted by an unbroken series of stations belonging to the Imperial German Navy.

"All telegrams, private messages included, sent off within a range of about 150 km. are taken up and forwarded at the low tariff of 80 pf. per 10 words, irrespective of the nationality of the despatching vessel or even of the telegraphic system used. The *English coast* is surrounded by a similar number of stations, though they are not yet under state control. Moreover, the coasts of the United States of America will shortly be lined, in like manner, by a chain of stations that will checkmate the present narrow minded and short-sighted policy of small companies possessing isolated stations there. Briefly, the near future will see navigation on all main lines of traffic compelled to reckon with the possibility of telegraphing.

"A very characteristic application of wireless telegraphy may be seen in connection with the army. It was, here, essential that apparatus should be found which enabled the movements of troops, and especially of cavalry, to be followed when marching either on main roads or across country.

"This extremely difficult problem has been solved by us in the following way. Light military vehicles have been constructed to carry both the whole apparatus of a station and the necessary supply of current, the aerial wires being held by balloons or kites in lieu of masts. When temporary use is to be made of the car-apparatus in connection with aerial conductors borne by masts or towers, the wave-length of the former is simply to be adjusted to that of the latter."

Several wireless telegraphy stations have been installed during the last year in Far East, and this part of the world offers exceptional conditions and reasons why the systems should be extended. Messrs. Arnhold Karberg & Co. are the agents of the "Telefunke" Company for China and Manchuria, and Messrs. Behn Meyer & Co. for the Philippines and Straits Settlements.

FAR EASTERN ENGINEERING AND CONSTRUCTION NEWS

PERSONAL

Messrs. H. Sietas & Co., Chefoo, have taken over the entire stock and premises of Messrs. Gardner & Co., of that city.

Mr. E. S. Rengall, of the Holland-China Trading Company, has returned to his duties in Tientsin after an absence of six months in Europe.

Mr. Harper, a well-known contractor of Chefoo, has started on a trip through Mongolia *via* Kilgan. He expects to visit Irkutsk and Lake Baikal before autumn.

Mr. Burgess, of Messrs. Howarth Erskine's Penang electrical department, who was transferred to the firm's Singapore works several weeks ago, will shortly return to Penang.

Mr. C. E Spooner, C. M. G., in the service of the British Government in the Federated Malay States, is likely to be transferred to Singapore in charge of the Tanjong Pagar Docks.

Mr. J. W. Ragsdale has received instructions from Washington to remain permanently as American Consul-General in Tientsin, and his pay has been increased by $1000 gold per annum.

Mr. F. H. Cronell has retired from the management of the Electric Engineering and Fitting Company of Tientsin to accept the management of the New York Life Insurance Company in South China.

Mr. Honigman, who has been in charge of the Chefoo office of the China Eastern Railway Company for several months, has started for Russia *via* the United States. Prior to his residence in Chefoo Mr. Honigman was connected with the railway company in Hankow and Dalny.

Mr. R. H. Eckford of Cornabé, Eckford & Co., Chefoo, has sailed from Shanghai for his old home in England, *via* San Francisco and New York, where he will visit for several months. Mr. Eckford, although a young man, is esteemed in North China for his business qualifications, and socially he is a favorite.

Mr. A. Ross Owne, formerly in the service of the Canadian Pacific Steamship Line at Hongkong and Yokohama has opened an office for the company at Shanghai, where he began to act as agent on July 1st. Messrs. Jardine, Matheson & Co , who have so long and satisfactorily represented the company in North China, will continue, as formerly, to act as agents at the other China Coast and Yangtzse ports.

DEATH RECORD.

Mr. Staats, of the firm of Messrs. Bielfeld & Son, Chefoo, died recently at that place. He was 34 years of age.

Mr. W. G. C Walter, harbormaster at Port Swettenham, S. S., died recently, and the remains were buried at Kuala Lumpur.

FIRE RECORD.

SAIGON RICE MILL BURNS.—A large Chinese-owned rice mill, which had been working for about three weeks, was destroyed by fire at Saigon recently. The loss is estimated between $200,000 and $300,000.

RAILWAYS, SUPPLIES, ETC.

RAILWAY CONCESSION, CHINA.—The railway concession between Chekiang and Kwangtung Provinces has been proposed by a Mr. Bash, but the gentry of Hangchow have passed resolutions to oppose the proposal.

MALACCA RAILWAY.—The Malacca Railway will be transferred to the Government of the Federated Malay States on payment by the latter of the capital cost incurred in the construction of the line.

BRANCH LINES, CHINA.—Several branch railways are being considered in Shantung—one from Chinanfu to Chiningcho; one from South Tsintau to Suchien in Kiangsu, and one from Northwestern Shantung to Chihli.

PEKING-CHANCHAKAO LINE.—The construction of this railway has been commenced. It is to be completed in three years at an estimated expenditure of Tls. 8,000,000. The improvement has been undertaken by the Chinese Government.

PEKING-KALGAN LINE.—The Russians are said not to be satisfied with the building of the Peking-Kalgan line by Chinese, and that they wish to build a line from Kulum to Khalkha, so as to make connection with the Chinese road.

ANOTHER PACIFIC STEAMER.—Mr. Robert Dollar, who is now in Europe, has ordered from Messrs. A. Rogers & Co., of Glasgow, another large steamer for the Pacific trade. He recently took over the *Hazel Dollar* and the new vessel will be a duplicate.

RAILWAY CONSTRUCTION IN BURMA.—On the Henzada-Kyangying line good progress has been made during the six months work has been actually in hand. On the Pegu-Martaban line the earthwork is well advanced and the banks for about half the length have been thrown up.

FEDERATED MALAY STATES RAILWAYS, 1904.—The length of railways open in the Federated Malay States at the end of 1904 measured 339 miles, and the working expenses have increased from abnormal causes—the rate being about 59 per cent at the outlay. The estimated percentage return on capital in 1904 was 4.60.

JOHORE STATE RAILWAY.—This last link in the Penang-Singapore line is well in hand as a part of the Federated Malay States system of railways. Though meter gauge it is to be laid with 80-lb. steel rails, and the crown agents for the colonies have just placed an order for nearly 8000 tons with the necessary fishplates and dog spikes.

RAILWAY CONCESSION, CHINA.—Viceroy Chang Chih Tung has telegraphed from Canton to the Government at Peking that he is in receipt of a cable message from Liang Cheng, Minister to America, to the effect that there is every chance of the Canton-Hankow Railway Concession reverting to the Chinese with the willing consent of the Washington Government.

N. P.'S NEW PORT OF CALL.—It is announced that in the near future the steamers of the Northern Pacific Steamship Company, plying in the trade between the Sound and the Orient, will call at San Francisco on the return trip from the Far East. The company is now operating the steamers *Minnesota, Shawmut, Tremont, Pleiades, Hyades*, and *Lyra*, and will have the *Dakota* in the Pacific waters this summer.

SEOUL-WIJU RAILWAY, KOREA.—The question has arisen as to the prolongation of this line into Manchuria, so as to connect with the extra-mural railway system of China with Newchwang Two routes are now under discussion, one *via* Antung, Takushan, Siuyen, Tangchi, Tashichiao and Yingkow, a distance of 211 miles; the other *via* Fenghwangcheng, Siuyen, Tomucheng, Tashihchiao and Yingkow, or 186 miles. The first skirts the shores of the Yellow Sea, whereas the other is an inland route.

TRANS-PENINSULA RAILWAY, F. M. S.—This line will be built across the peninsula from West to East. It will start from a junction at Bukit Mertajan in Wellesley Province. Mr. C. Edwin Spooner will inaugurate the construction work, and Mr. Combes, who has conducted all railway surveys in the Federated Malay States during the last four years, will shortly proceed to Perak and Wellesley Province in connection with the trace for the new line, which, after starting from Bukit Mertajam, will in all probability pass through Kulim and Kedah and through Upper Perak and across Kelatan to the Kwala Kelatan. This line will tap an enormously wealthy mineral country.

PROPOSED HONGKONG-CANTON RAILWAY.—The Governor of Hongkong, at a recent meeting of the Legislative Council of the colony, thus referred to the question of a railway from Hongkong to Canton, which had been hung up for years until he took up the reins of government:—"Since we last met negotiations have been opened at Peking with the Chinese Government for an agreement for the joint working of a railway line of 4 ft. 8½ in gauge from Canton, with one from Kowloon to the frontier of the New Territories. It is proposed that this agreement should be on the lines of one concluded by the Colonial Office on behalf of this Government with the British-China Corporation. A party of surveyors engaged to locate the line within British territory has arrived in Hongkong from England."

CANTON-WHAMPOA LINE CHINA.—The United States Minister at Peking having lodged a protest against the building of a railway from Canton to Whampoa owing to its being detrimental to the interests of the Canton-Hankow Railway Concession, the Minister of the Board of Commerce telegraphed to the viceroy under whose jurisdiction the new enterprise was organized, requesting him to furnish full particulars of the proposed road. In reply the viceroy stated that the line from Canton to Whampoa will be built by Chinese with Chinese capital, and that it is not in the way of the Canton-Hankow line, which commences from Wong Sha to the West of the city, whereas the Whampoa line will start from outside the East Gate of the city. The viceroy urges the Central Government not to allow foreign interference with the building of this road.

RAILWAYS IN FORMOSA.—When the Japanese took over Formosa, according to a correspondent of the *China Mail*, they found it advisable to take up and relay the line. They then built a branch to connect Taipeh and Tamsui, and continued the main line in a southerly direction. At the same time work was begun in the South, and, by the end of 1901, rails were laid from Takow to Trinan. At the beginning of the current (1905) year, the northern railhead extended 100 miles South from Keelung, while the southern section was 97 miles long. As the total length, including the Tamsui branch, is estimated at 260 miles, the above 197 miles plus 13, makes 210 miles, leaving a gap of 50 miles between the railheads. As the work is being rapidly pushed on just now this gap is expeditiously closed up. By the present time the hiatus left is only about 9 miles, but as several tunnels and two large bridges are required it is estimated that it will be fully three years before trains can be run through. Meanwhile the railheads are being connected as far as possible by a temporary line.

ELECTRIC LIGHTING, TRACTION, POWER, ETC.

NEW CABLE TO FAR EAST.—The Postal Telegraph-Cable Company of America, in connection with the Commercial Pacific Cable, has laid new cables to the Caroline Islands and the Dutch East Indies. These cables are not open for public use.

ELECTRIC TRAMWAY, CHEFOO.—The construction of the electric tramway along The Bund and around the Native City of Chefoo will probably be commenced shortly. The iron rails have already been delivered along a portion of the route.

TELEGRAPH LINE, THIBET TO YUNNAN.—The agreement providing for the connection of the telegraph line from Thibet to Yunnan, has been signed by an envoy sent from Lhassa to Peking, and a representative of the Chinese Imperial Government.

ELECTRIC POWER, HAWAIIAN PLANTATION.—Plans have been effected for the commencement of work to establish an electric plant on the Island of Kauai, Hawaii, for operating the irrigating pumps on the McBryde plantation. The capital stock is $300,000 gold.

BIG TURBINE PLANT.—The Japanese engineering and contracting firm of Takata & Co. has just placed, through its New York office, an order for a 1000-h. p. turbine with Jas. Leffel & Co., Springfield, O., which will be used under a 75-ft. working head. For the control of this turbine a Lombard improved type "*D*", oil-pressure, quick-acting water-wheel governor has been ordered. This outfit is to be installed in the Kosaka mine in Japan.

SHANGHAI TRAMWAYS.—In compliance with the result of the recent special meeting of ratepayers, the Municipal Council of Shanghai has decided to formally tender in writing the concession to Messrs. Bruce, Peebles & Co., upon the terms of the contract. With reference to the committee of ratepayers appointed to consider the question of the construction of the new system, it has been decided to offer it facilities for holding meetings in the council room, and to supply such information, etc., as may be called for.

PROPOSED ELECTRIC TRAMWAYS, NANKING, CHINA.—The viceroy of the Liangkiang is seriously considering the advisability of building an electric railway line at Nanking. Steamers must anchor at Hsiakuan, a small village on the river bank, about half a mile outside the city wall, and five or more miles from the crowded business portion of the city. Within the last few years a well-made macadamized road has been completed, nine or more miles in length, but the only means of transportation is by donkeys, horses, jinricksha, or very poor and expensive carriages. Chinese are obliged to spend more for their transportation from Nanking to Hsiakuan than for the 36 hours' steamship voyage from Hsiakuan to Shanghai.

ELECTRIC RAILWAY EXTENSION, MANILA, P. I.—The Philippine Commission has passed an Act authorizing the Manila Electric Railroad and Light Company to extend its system of lines by building a double-track road from the present terminus of what is known as the Malate line, at the Pasay race track, to and along a private right-of-way to be acquired by the grantee parallel to the road known as Calle San Luis running from Malate to Parañaque, a distance of approximately 3,000 ft., crossing the said road at the terminus of the line and making a loop upon property to be acquired by the grantee on the East side of said road. The company is granted the right to expropriate such real estate as may be necessary for the purposes of the franchise granted in this Act.

GENERAL ELECTRIC'S HONGKONG AGENCY.—The General Electric Company of London would appear to have taken a step in the right direction when they appointed Messrs. E. C. Wilks & Co. of this city to be their sole agents for this part of the East. The latter firm has on view a wonderful assortment of things electric, and those interested, as well as those of an inquiring turn of mind, will be well repaid by a visit to their offices, in Beaconsfield Arcade, to inspect the electrical samples there displayed, for it is truly interesting and surprising to see the miscellaneous stock of fittings of all sorts on exhibition. There are to be seen church lights, in handsome brass chandeliers of ecclesiastical design; all sorts of household and ship fitting lamps of all sorts, shapes and sizes, with very dainty wall brackets, electroliers, pendants, etc., and so on down to the electric stoves, and even electric kettles, saucepans, laundry irons, shaving-pots, and ladies' curling-tong heaters. In another department is to be seen a remarkable assortment of various types of medical apparatus, worked by electricity. Many of these articles would be bound to command an immense sale, and should prove a real boon to the colony, if the Electric Company of Hongkong could supply and maintain a regular current, at a reasonable rate.—*Hongkong Telegraph*.

WATERWORKS AND IRRIGATION

IRRIGATION IN INDIA, 1904-05.—The return of irrigation operations of the spring crops of the united provinces of India for 1904-05 up to March 31st, last, has just been published and gives the total irrigated area as 1,405,364 acres as against 2,027,201 acres for the corresponding period in 1904.

WATERWORKS PLANT, SINGAPORE.—The municipal commissioners of Singapore have addressed a letter to the Legislative Council of the Straits Settlements asking that a special ordinance be passed to enable them to borrow $9,000,000 for the completion of the waterworks system It is estimated that the expenditure yet to be incurred will amount to about $8,500,000, but the round figure of $9,000,000 has been

adopted in order to expedite the loan. According to a Singapore paper this sum is not to be retrospective in its application in the sense of covering any work already done. It is to be applied to the payment of the balance of the cost of the Kallang and Seletar schemes, further purchase of lands for catchment areas, construction of reservoirs, acquirement of pipe-laying lines, etc. When the whole of the Kallang and Seletar valleys has been tapped, Singapore will possess a water supply that will put a shortage or the prospects of a water famine out of the question for many years to come. In some quarters it was thought that the city was getting near the end of its expenditure for water supply purposes. But there is still a vast deal of work to be accomplished before the extension scheme, as approved by experts, is completed. For its completion the commissioners have now decided to ask for special powers to raise the total sum required at an advantageous rate of interest instead of borrowing from time to time in minor sums at a higher rate to meet the working expenses as they fall due.

BUILDINGS

HOTEL ENTERPRISE, CHINWANGTAO, CHINA.—The Chinese Engineering and Mining Company, Tientsin, is on the point of building a first-class hotel at Chinwangtao, and Messrs. Adams & Knowles are the architects of the building. The hotel will be built in the best style, will be situated on the Bluff, and thus have an ideal situation from the point of view of visitors and others in the summer time. The company, while building the hotel, will not attempt to do the catering. For this purpose the hotel has been leased to the Astor House Hotel, Ltd., Tientsin, and it will be opened next summer.

PUBLIC WORKS

CITY DRAINAGE, HONGKONG.—During 1904 about $20,000 were spent on the reconstruction of street gullies to improve the drainage system of Hongkong.

PUBLIC WORKS EXTRAORDINARY, HONGKONG.—Ten thousand, four hundred and twenty dollars have been appropriated for urgent public improvements in the colony.

PUBLIC WORKS, MANCHURIA.—The new Chinese viceroy of Manchuria is said to have raised a sum of Tls. 1,000,000 for various public works in Manchuria as soon as he takes up his post.

ROAD WORK IN ALBAY PROVINCE.—The Provincial Board of Albay Province, Luzon, has commenced the construction of a fine public road from Tabaco to Ligao. This will open up an immensely rich hemp strip.

STREET PAVING, CALCUTTA.—A definite report is expected very soon from the corporation officers as to the suitability of asphalt as a road surface, as compared with granolithic and patent stone, with reference to its proposed use in various roads in the northern section of Calcutta.

FORT MCKINLEY CONSTRUCTION.—Seven more of the buildings at Fort McKinley have been completed and formally turned over to the Army by Mr. O. F. Campbell, contractor for the work. They include four hospital wards, one brigade headquarters building, one enlisted men's barracks and one civil employees' quarters.

ROAD CONSTRUCTION IN THE PHILIPPINES.—Of the -P-1,335,600 appropriated about a year ago for road construction in the Philippines -P-491,227 31 were expended during the fiscal year. This money was distributed through eleven provinces, the total number of persons receiving employment on road work being estimated at 80,000. Among the many pieces of work undertaken by the Bureau of Engineering in this connection was the control of the Tarlac and Pampanga rivers for future protection against floods.

PORT WORKS, DREDGING, DOCKS, ETC.

TANJONG BATU WHARF, B. N. B.—Preparations are being made for the construction of a new and large wharf at Tanjong Batu, British North Borneo, the sea end of the light railway from the manganese works.

NAVAL DOCK, NANKING.—A new naval dock is to be built at Pei Ho Kow, Nanking, for the use of vessels belonging to the Imperial Chinese Navy. The grounds have been surveyed by foreign experts, and foreign engineers have now been engaged for the construction of the dock. Work on the improvement will be commenced shortly.

SHIPBUILDING, MARINE, ETC.

STEAMER "BLACKHEATH" SOLD.—The steamer *Blackheath*, one of the Watt's fleet of vessels, has been sold to Japanese owners.

SHIPBUILDING, HONGKONG.—During 1904 steam launches and other vessels with an aggregate tonnage of 7,290, tons were built in Hongkong.

WHITE STAR "GAELIC" SOLD.—The White Star steamer *Gaelic*, 4,206 tons, has been sold to the Pacific Steamship Navigation Company, Liverpool.

RUSSIAN STEAMER "PROMETHEUS."—The Russian steamer *Prometheus* is now the property of the Nippon Yusen Kaisha and is called the *Urajiro-maru*.

VESSEL CHARTERS, JAPAN.—The British steamers *Victoria* and *Ganges*, and the Japanese steamers *Tamon-maru* and *Naniwo-maru* have been chartered to the Nippon Yusen Kaisba for the company's home services.

STEAM LAUNCH "ALICE" SOLD.—The steam launch *Alice*, length over all 47 ft. 6 in., breadth extreme 9 ft. 6 in., depth moulded 5 ft. 3 in., was purchased recently at auction in Hongkong by Mr. C. Schleuter for $2,000.

RUSSIAN WARSHIP "PALLADA" REFLOATED.—The Japanese have raised the warship *Pallada* which has been lying aground at the entrance to the Harbor of Port Arthur since February 19th, 1904. She is a second-class cruiser of 6,630 tons and was built in 1902. Her speed is given at 20 knots.

STEAMER "MICHAEL" CHARTERED.—The steamer *Michael*, which was captured by the Japanese soon after the outbreak of the war, has been chartered to the Toyo Giogyo Kaisha. She underwent extensive repairs at the Inoshima dockyards and is now in the company's service between Yokohama and Hokkaido.

CRUISER "VARYAG" FLOATED.—The Russian cruiser *Varyag* (6,000 tons) has finally been successfully floated. When she rose once more to the surface she had a list to port, but she is now on an even keel and will soon be towed to Sasebo. The *Varyag*, before her disaster at Chemulpo, was one of the finest of Russia's protected cruisers in the Orient. If she can be restored to her old condition she will be a valuable addition to the Japanese Navy.

AMERICAN-ASIATIC STEAMSHIP COMPANY.—This Company has issued the following announcement:—With a view to the improvement of the service of this company to Far Eastern ports, *via* the Suez Canal, it has been decided to dispatch alternate steamers as follows: to Singapore or Penang and Manila, Kobe and Yokohama; to Aden, Singapore or Penang and Hongkong and Shanghai. The other ports of call will be substituted or added when sufficient cargo offers.

JAPAN'S MERCANTILE FLEET.—From the commencement of the war in the North to the end of last year the number of steamers purchased from abroad or built in Japan for that country's mercantile fleet represents an aggregate tonnage of about 200,000. The Japanese steamers lost during the same period, including those used for the blockading of the mouth of Port Arthur harbor, or sunk by the Russians, represent about 70,000 tons, making an actual increase of about 130,000 tons in the aggregate tonnage of Japan's mercantile fleet.

N. Y. K.'S MARITIME LOSSES.—Since the beginning of the war the Nippon Yusen Kaisha is reported to have lost 11 vessels, aggregating 32,372 tons. All of these vessels have been lost in the service of the Japanese Government, sunk at Port Arthur, etc., or sunk by Russians when acting as transports. In order to maintain their services which run under contract with the Government, the fleet will have to be renewed, and as the compensation paid by the Government in respect of the steamers lost is insufficient to build the new vessels required, the company will probably have to resort to a loan.

REPAIR OF RUSSIAN WARSHIPS, SHANGHAI.—The Shanghai Taotai recently received a protest from the Japanese Consul-General there against the proposal of the Russian Consul that such of the newly-interned Russian vessels as needed repairs be allowed to enter the docks of Messrs. S. C. Farnham, Boyd & Co., for the purpose. It was also demanded that the Russian vessels interned at Shanghai be moored together, instead of being scattered as they were. The Taotai communicated with the Commissioner of Imperial Customs, asking the latter to select a suitable place in the Hangpu for the purpose in view.

TRANS-PACIFIC TONNAGE.—The demand for tonnage in the trans-Pacific trade is making enormous strides. The mammoth steamers lately added to the service are now carrying freight to their fullest capacity, but they relieve to a very small extent the congestion of cargo at the different ports along the coast awaiting shipment to the Orient. In order to lessen this strain the big steamship companies are calling for more tramp steamers, and, from Europe to the Pacific Coast via the Orient, there has been of late a stream of large freighters, hurrying across the Pacific to the coast, with charters to carry freight to the Orient. Among these are the steamers *Salfordie, Drayton Grange, Forreric, Ocean Monarch, Telemachus, Oanta, Nairn, Colombo, Guernsey*, and *Camosun*. These are not regular liners, but are chartered for the occasion. The opening of Port Arthur by the Japanese has created another avenue for the trade. The Japanese Government has already chartered a number of vessels to carry cargo from the United States to Port Arthur. Two of them are the British steamers *Sandhurst* and *Irydene*. All the tramp steamers that are now on the way to Japan and China deeply laden with cargo will return to San Francisco.

MINES AND MINING

RAUB GOLD MINES, F. M. S.—It is reported that a rich lode has been struck on the property of the Australian Raub Gold Mining Company's property in the Federated Malay States.

WORLD'S PRODUCTION OF PETROLEUM.—Of the 28,577,900 tons of petroleum produced throughout the world in 1904, Sumatra, Java and Borneo supplied 1,000,000 tons, Russia 10,600,000, and India 401,000 tons. America led in the output with 15,000,000.

COAL DISCOVERY, BURMA.—The Burma Mines Development Company has discovered a coal deposit in the Chindwin District of Burma. There appears to be a seam 6 ft. thick of quality equal to the best Bengal coal, and quite close to the surface.

OUTPUT OF TIN (F. M. S.), 1904.—The annual report of the Resident-General of the Federated Malay States, just issued, shows that the output of tin in 1904 was 856,238 piculs against 841,993 piculs in 1903. More Tamils now constitute the mining labor force, and labor-saving appliances are more in use.

PETROLEUM IN BURMA.—The Government of Burma has granted permission to certain parties to prospect for petroleum in the Singu oil fields in the Myingyan District. These particular fields have not hitherto been exploited to the extent of the larger Yenang-yaung and Yenanga fields of the Pakokku District.

OBSTRUCTIVE MINING REGULATIONS, CHINA.—Owing to the mining regulations of Hunan Province being obstructive to the mining concession of Messrs Carlowitz & Co., the German minister has drawn the attention of the Peking Government to these regulations and demanded that Governor Tuan Fang be reprimanded for his anti-foreign attitude.

MINERAL DEVELOPMENT, CHINA.—The Peking Government has instructed the different viceroys and governors to open mines, but on the condition that no foreign capital is employed for working the mines and no mining contracts are given to foreigners. These conditions also apply to railways. The Government has been led to issue these instructions owing to the application of the Viceroy of Yunnan for permission to borrow a foreign loan for building the railway from Yunnan to Szechuan.

KOLAR GOLD FIELDS, INDIA.—Following are the returns for the month of May, 1905: *Balaghat.*—4,000 tons of quartz crushed yielded 3,154 oz. and 2,750 tons of tailings cyanided 248 oz., making a total of 3,402 oz. as compared with 3,389 oz. of bar gold in April. *Champion Reef.*—Milled 19,025 tons which produced 16,290 oz. and 13,494 tons of tailings treated by the cyanide process produced 1,814 oz., making a total production of 18,101 oz., of gold as compared with 19,592 oz. in April. *Mysore West.*—Mill ran 684 hours, crushed 2,033 tons which yielded 1,010 oz. of bar gold. *Nundydroog.*—6,700 tons of quartz crushed yielded 5,573 oz., and 5,557 tons of tailings cyanided yielded 548 oz., making a total yield of 6,121 oz of bar gold as compared with 6,027 oz in April. *Ooregum.*—Stuff crushed 10,063 tons, gold produced 4,527 oz. and slimes and tailings cyanided 10,090 tons, gold produced 956 oz., making a total yield of 5,483 oz of bar gold, as compared with 5,498 oz. in April. *Mysore.*—16,500 tons of quartz crushed produced 1,554, oz. and 13,650 tons of tailings cyanided yielded 1,428 oz., making a total production of 16,976 oz as compared with 16,822 oz. in April.

FINANCIAL NEWS.

KINTA TIN MINES.—The Kinta Tin Mines, Ltd., has declared a further dividend of 6d per share, payable in London.

INTERNATIONAL BANKING CORPORATION.—The head offices of the International Banking Corporation in New York have been removed from No 1, Wall-st, to No. 60, Wall-st.

JAPANESE GOVERNMENT BONDS.—Coupons due June, 1st, of the Imperial Japanese Government 5 per cent bonds for -Y-43,000,000, are being paid at present by the Yokohama Specie Bank, Ltd.

BANGKOK MANUFACTURING COMPANY, LTD., SIAM.—This company has increased its capital stock from Tcs. 14,000 to Tcs. 400,000 for the purpose of erecting a larger plant for the manufacture of ice.

FARNHAM, BOYD & CO., LTD., SHANGHAI.—This firm has declared a final dividend of Tls. 8 per share, making Tls. 13 per share for the year; transferred Tls. 100,000 to reserve fund, and carried forward Tls. 34,000.

TIENTSIN GAS AND ELECTRIC LIGHT COMPANY, LTD.—This company has paid a dividend of 8 per cent to shareholders on the business of the year just closed. It is now about ready to supply householders with electric light.

TIENTSIN COMPANY ABSORBED.—The Electric Engineering and Fitting Company of Tientsin has been transferred to the Chinese Imperial Telegraph Department, which has purchased the interests from Messrs. Poulsen and Von Hanneken.

SHANGHAI ELECTRIC AND ASBESTOS COMPANY, LTD.—The annual report of this corporation for 1904, just issued, shows that the company has paid a 10 per cent dividend, given the staff a bonus of $2500 and carried forward nearly $7000 to current account.

CHINA LIGHT AND POWER COMPANY, HONGKONG.—The gross profits of this corporation for the year ended February 28th, amounted to $53,755 39, and the net profits, including the amount brought forward from the preceding year, and after payment of interest and other charges, were $26,896.12.

FOREIGN LOAN, CHINA.—It is reported that a certain railway will shortly be hyphotecated to American capitalists for a loan of Tls. 10,000,000 with which the Chinese Government will raise six more army divisions for the North. A foreign loan is also desired for the development of Manchuria.

DIVIDEND, HONGKONG-SHANGHAI BANK.—The Hongkong and Shanghai Banking Corporation announces that subject to audit the dividend for the half-year ended June 30th, 1905, will probably be £1.15s. per share; to be placed to the reserve fund $500,000 and to be carried forward to the current half year $1,700,000.

INDO-CHINA STEAM NAVIGATION COMPANY, LTD.—Out of the profits of this company in 1904, £20,000 have been transferred to the credit of general reserve fund, a dividend of 12 shillings per share declared,

and in addition the following provisions made:—Transfer to depreciation account, £65,000; transfer to exchange fluctuation account, £4000; transfer to underwriting account, £35,000; carried forward, balance of about £4500.

NEW AMOY DOCK COMPANY, LTD.—This Company has decided to increase its capital stock to $67,500 by the issue of 4000 new shares of $6.75 each at a premium of $10 per share. The plant, machinery and general equipment of the dock is reported to be better than ever before. The present general manager of the company is Mr. R. H. Bruce, he having succeeded Mr. B. Hempel.

MEIJI FIRE INSURANCE COMPANY, LTD.—The premiums collected by this Tokyo corporation, less re-insurances, amounted to -Y-587,190,753, and the total income to -Y-1,162,792,133, showing an increase of -Y-36,192,427 over the preceding year. The net profits of the year were -Y-228,179,508. A dividend of 17 per cent to shareholders has been ordered, absorbing -Y-42,500,-000 while -Y-185,679,508 have been transferred to the reserve fund.

SHANGHAI MERCURY, LTD.—The directors' annual report shows that after paying an interim dividend of 4 per cent in December last, writing off Tls 1295.83 for depreciation, etc., reducing the good will account by Tls. 2000, and providing for directors' and auditors' fees, the balance to the credit of profit and loss account amounts to Tls. 6120, out of which a final dividend of 5 per cent has been paid, absorbing Tls. 5250, the balance, Tls. 1170, being carried forward.

SHIPBUILDING IN JAPAN.—The Kawasaki Shipbuilding Yards of Kobe are at present busily occupied with over 10 steamers on the stocks or in course of completion. Business has greatly developed in the course of the last three years, and it is announced that it is the intention of the company to shortly make a call for further capital during the next few months and to increase the capital by -Y-6,000,000. The present capital of the company is -Y-1,000,000, of which -Y-3,200,000 is paid up, and with the proposed increase the company will be capitalized for -Y-10,000,000. Its resources and property are at present valued at -Y-10,000,000.

CALCUTTA ELECTRIC SUPPLY CORPORATION, LTD.—The number of units ef electrical energy sold by this corporation during 1904 was 2,760,457, compared with 2,011,681 for the preceding year, an increase of 35 per cent. The gross revenue from all sources amounted to £60,243, compared with £47,139, an increase of 27¾ per cent. The working costs, including provision for renewals, were £30,744, compared with £25,552 an increase of 20 per cent, and the net revenue £29,499 compared with £21,587, an increase of 36½ per cent. The capital expenditure during the year amounted to £41,733, the principal items of which are freehold land and buildings £3,995; machinery and tools £15,995; mains £14,163; meters £6,615; and £565 on electrical instruments. The total capital expenditure amounted to £124,503.

STRAITS TRADING COMPANY, LTD., Singapore.—After making ample provisions for bad and doubtful debts, the net profits of this company for a year amount to $489,409.20 to which has to be added the balance $84,813.29 brought forward from last account, giving together a sum of $574,222.49 for disposal as follows: 1. A dividend of $1 and a bonus of 50 cents per share to shareholders, absorbing $375,000; 2. $50,000 added to the reserve fund which now stands at $800,000; 3. $50,000 added to the fund for equalising dividends which now stands at $100,000; 4. $15,000 transferred to employees' bonus account; 5 the balance of $84,222-49 carried forward to a new account. The Pulo Brani and Penang Works have been maintained at a high state of efficiency, ensuring expeditious and efficient smelting of the Company's purchases of ore, etc.

SELANGOR (F. M. S.) FINANCES, 1904—The revenues of the State collected in 1904 amounted to $8,241,766, which sum is $776,441 in excess of the estimated revenues, but $215,855 less than the amount collected in 1903. The decrease is accounted for by the fact that the price of tin was, during 1904, considerably less on an average than during the previous year. The duty on this product in 1903 was $3,364,303 and in 1904 $3,138,649. The expenditure for 1904 was $5 922,143, which exceeded that of 1903 by $1,073,074, but was $640,591 less than the sum estimated. The assets of the State exceeded the liabilities at $13,482,980 the actual figures being as follows:—Assets, $13 726,010; liabilities, $243,030. The capital account of the Selangor and Negri Sembilan section of the Federated Malay States Railway was increased in 1904 by $277 548, and stood at the end of the year at $12,861,878. The railway revenue for the year was about $1,616,746.

HONGKONG'S FINANCES.—According to Hongkong's Blue Book for 1904, just issued, the total revenue for the year amounted to $6,376,235.30, an increase over 1903 of $1,570,190.11, and $200,739 99 above the estimate. The expenditures amounted to $4.993,421.18, exclusive of public works extraordinary, or altogether, $6,376,-235.30 This is an increase of $979,565.82 over the 1903 expenditures. On the year's working there was thus a surplus of $132,812.69. The assets of the colony at the end of 1904 were $1,445,381 80, exclusive of arrears of revenue, which bring the total up $1,651,470.68. The liabilities totalled $1,147 658 98, leaving a surplus of assets of $503,812,01. The public debt amounts to £341,799 15s. 1d. The original debt was incurred in connection with the Praya reclamation, the Central Market, and water, drainage and sewerage works. Interest at 3½ per cent is payable on the loan, which is being paid off by a sinking fund now amounting to £31,375 7s. 6d.

CHINA MUTUAL LIFE INSURANCE COMPANY, LTD. SHANGHAI.—The income and reserves of this corporation have now reached the Tls. 1,000,000 mark. During the year of business just closed the income has increased Tls. 295,013, reserve Tls. 581,952 and assets Tls. 687,103, while the insurance in force has increased Tls. 3,939,103. A dividend of Tl. 1 per share was paid on July 1st, and another like dividend has been declared for January 1st, 1905. The new applications received for the year amounted to $9,803,238 89, an increase over the preceding year of $1,325,989 59, for which policies for $8,916,733.54 were issued, and $886,505.35 postponed or declined. The total insurance in force March 31st, 1905, amounted o $21,110,106 63. The total income for the year amounted to $1,658,025.71, a gain over the preceding year of $409,739.63. The income from interest and commission on loans amounted to $179,917.51, an increase during the year of $55 631.01. The reserve accounts have been increased by $807,132.82, and now stand at $1,917,435.24. The surplus over and above paid up capital, reserve and exchange and investment fluctuation account amounts to $118,151.45.

HONGKONG HIGH LEVEL TRAMWAYS COMPANY, LTD —At a recent extraordinary meeting of shareholders, this company resolved to sell out its property and other interests to the Peak Tramways Company, Ltd., and dissolve itself as a going concern. The capital of the new company is $750,000 divided into 75,000 shares of $10 each of which 25,000 shares have been reserved for the stockholders in the defunct company, if they desire to accept scrip in the new company for their old holdings, leaving 50,000 shares of $10 each to be offered to the public. The total cost of obtaining the concession is borne by the new company and amounts to $35,000, of which sum $25,000 goes to Mr. Findlay Smith, the concessionaire of the new line, The price paid for the stock of the old company was $200 per share, or $250,000 for the entire holdings. The new Tramway will start from Ice House Lane, skirting the western side of the Public Gardens, thence up the Glenealy ravine, west of Queen's Gardens, crossing the Peak-rd and thence on to a point somewhat above Hon. Mr. Shewan's house on the Peak-rd and up to Victoria Gap. It will take about three years to complete the improvement. The new company is under the management of Messrs. John D. Humphreys & Son, with a consulting committee consisiing of Sir Paul Chater, C. M. G.; Hon. C. W. Dickson, Mr. C. Ewens, and Mr. A. J. Raymond.

RESIDENT GENERAL'S (F. M. S.) REPORT, 1904.—The administration report of the Federated Malay States for 1904 made by Mr. W. T Taylor, Resident-General, shows that the revenue was $22,555,269 against an outlay of $19,318,768. Land revenue showed steady and satisfactory increase. The outlay was largely swelled by extra expenditure on railways and public works. The Federated Malay States investments at the beginning of 1905 in respect of cash balances included gold securities of the nominal value of £554,537 (consols £410,796 and colonial funds £143,741). Indian 3½ per cent stocks of the nominal value of Rs. 50,18,100, municipal loans $2,200,150, loans to the colony of the Straits Settlements $600,000, fixed deposits in the local banks $2,750,000, and 2,931 shares of the Tanjong Pagar Dock Company The returns of trade show a decline in the imports and exports of these States for the year 1904 as compared with the year 1903. Excludidg bullion and specie the recorded value of imports for the year was $36,867,129 against $41,427,287 in 1903, a decrease of $4,560,158. The value of the exports of merchandise, etc., from the Federated Malay States in 1904 shows a reduction of $4,772,666 the figures being $73,696,984 for 1904 against $78,469,650 for 1903. These figures exclude bullion and specie, the recorded exports of which were $3,923,100 in 1904 as compared with $1,784,294 in 1903. The increase under this head is no doubt due to the operations connected with the introduction of the new currency dollar.

MISCELLANEOUS NOTES

SHAPERS TO JAPAN.—The John Steptoe Shaper Company, of Cincinnati, Ohio, U. S. A., has just shipped four 16-inch and three 14-inch shapers to Tokyo.

PAPER MAKING, BURMA.—The Government of Burma is obtaining the services of an expert from England in connection with a scheme for the manufacture of wood and bamboo for the purposes of paper-making.

INDO-CHINA-SIAM BOUNDARY.—The work of marking out the boundary between French Indo-China and Siam has been broken in upon by the setting in of the rainy season. It will be 6 months before it can be resumed.

STONE CRUSHERS, SINGAPORE.—The Municipal Commission of Singapore has decided to order the new stone crushers which provision has been made for in the annual budget, and on arrival to erect them at the Pulau Obin quarry.

HANKOW IRON INDUSTRY.—The manager of the Hanyang Ironworks has engaged several foreign experts to take charge of the steel and smelting department of the works. These new assistants are expected to arrive in Hanyang shortly.

STANDARD OIL IN INDO-CHINA.—The Standard Oil Company of New York has obtained permission from the authorities of Haiphong to establish a petroleum and naphta depot on the right bank of the Cua Cham, at Thoung-Ly, near the Railway of Indo-China. This is considered an excellent site for the company to carry on operations in importing petroleum oil.

CABLE-LAYING IN THE FAR EAST.—Callender's Cable and Construction Company, Ltd., of England, reports that a considerable extension of the Company's business has taken place in the Far East. Cable-laying contracts have been completed, or are in progress, in India, Penang, Kuala Lumpur, Singapore, and Hongkong, while further orders are now in course of execution for Bangkok.

FLOATING EXPOSITION OF BRITISH INDUSTRIES.—The idea of an innovation of this character to go commercial travelling around the world has been revived in London. The exposition is to have its home upon a 6000-ton steamer, which will sail from England this (July) month or August, and call at about 40 British ports around the world and a few Chinese, Japanese and South American places of importance. The voyage is expected to last 9 months.

CHINA'S FIRST PATENT.—The Chinese Government, according to good authority, has granted its first patent. It is for an electric lamp. The inventor resides in Nanking and calls his lamp the "bright moonlight," and asserts that it is far superior to foreign glow lamps that hitherto have been sold in Shanghai and other cities. The fact that China has entered upon the granting of letters patent is considered to be of more importance than the invention.

SAW MILLS FOR JAPAN.—The J. A. Fay & Egan Company, of Cincinnati, Ohio, U. S. A., has shipped to Japan machinery to build twenty saw and planing mills at a contract price of $40,000 gold. The machinery goes direct to Tokyo, and from there distribution will be made to other points. It is the purpose of the Japanese Government to use this machinery for preparing lumber to be used in the manufacture of railway passenger and freight cars. Some of the cars are to be operated in railways in Japan, and the rest are to be used on the Manchurian Railway.

AMERICAN CONTRACTS IN THE ORIENT.—Important contracts have been closed for the American equipment of the first steel mill to be built in China and for Japanese wire-drawing, rolling mill and blast furnace plants. The work entails an expenditure of upward of $3,000,000 gold. A Cleveland company secured the contract. The company, which is to build the plant in the vicinity of Shanghai, has ordered a lot of machinery, including an electrically-operated furnace changing equipment. The contract for the Japanese steel wire-drawing mill is the first of its description ever let in the Far East. Another Japanese contract calls for all the machinery necessary to go in a large rolling mill and blast furnace plant to be built in connection with the Government arsenal at Kure.

MANCHESTER (ENG.) SHIPPERS' SORE.—According to the *London and China Express*, Manchester shippers to Manila are feeling rather sore about the detailed information which the American cunsular regulations require them to give about goods exported to the Philippines. Heretofore most of these formalities were attended to by the importer at Manila, but now it is necessary for the shippers to fill out forms in Manchester, giving exact particulars of the length, weight, count, and price of each description of cloth, and to furnish a complete set of patterns. The declaration must be signed at the Consulate by a member of the exporting firm. The British merchants express fear that the patterns and information so obtained, which, it is understood, are at once sent to Washington, will be accessible there to their American competitors, and will be used by them to undermine British trade in the Philippines.

REINFORCED CONCRETE EXPERIMENTS, SHANGHAI.—The Shanghai Reinforced Concrete, Company, Shanghai, which was organized as a going concern only recently, reports the success of an interesting experiment in its line of business. The experiment is on the extensions to the present Central Hotel, to be known in future as the Palace Hotel. Here, instead of putting in the usual iron girders for the beams, a process, composed partly of iron and partly of concrete, had been devised in its place, at much less cost and trouble. There are two such beams under experiment, each 21 ft. in length, 1 ft. in width and 2½ ft. in height, and are supported at either end by four concrete columns. The work of laying in the concrete was finished several weeks ago and the specified weight that each beam is supposed to carry is 27 tons. Those particularly interested in the experiment are Mr. Marty, of the company; Messrs. Scott & Carter, civil engineers and architects; and Mr. John Prentice, of Messrs. S. C. Farnham, Boyd & Co., Ltd., and the experiment decided upon was as to whether the newly-laid beams were capable of carrying the abnormous weight expected of them. The concrete company is also doing similar work in connection with the beams in the new German Club building on The Bund. Here, over the ball room, the span of one of the beams is not less than 40 ft. in length.

GASOLINE ENGINES IN THE ORIENT.—There is a growing conviction of the advantage of power plants in larger concerns in China, and the number of mills with fair-grade power plants is increasing. It will be only a matter of a short time, says the American consul at Hangchow, until the smaller manufacturers come to appreciate the need of power, and when that time comes there will be a field for gasoline engines almost beyond conception in its scope. As in the United States, there will be many cases and places where steam power will be preferable, but there are already many chances for the introduction of gasoline or naphtha power. Such engines are put out cheaply, and can be made cheaply and strongly enough to meet the requirements of a market where there is an absolute lack of knowledge of such machinery and its practical operation. Already Japanese manufacturers are commencing to make some machinery of this sort, and while it lacks the merit of the American product, and will always be more or less behind the latter, it by no means follows that it will not be readily accepted in China, and other raw materials and industrial necessities. They have American and European trained experts and they have labor so cheap that American competition on a labor basis is impossible. It behooves American manufacturers to get into the market in China with machinery of all kinds if they expect to hold these markets in the future. The power machinery for most mills in this portion of China is from England or Scotland.

FAR EASTERN STOCKS AND QUOTATIONS

Courtesy of Benjamin, Kelly & Potts, Sharebrokers, Hongkong, July, 1905.

Stocks	When Established	Capital	No. of Shares	Value	Paid Up	Reserve	At Working Account	Date	Last Dividend	When Paid	Approximate Return at Present Quotation* (Per cent)	Closing Quotations
Banks.												
Hongkong and Shanghai Banking Corporation	1865	$10,000,000	80,000	$125	$125	g £1,000,000 s $8,000,000 i $250,000	$1,493,408	31-12-04	£1.10/. and bonus £1 @ exchange 1/11 9-16=$25.46 for second half-year 1904	20-2-05	5¼%	$820 London £84½
National Bank of China, Limited	1891	£699,475	99,925	£7	£5	$200,000	$41,768	31-12-04	$2 (London 3/6) for 1903	1-2-04	—	$37 buyers
Marine Insurances.												
Canton Insurance Office, Limited	1881	$2,500,000	10,000	$250	$50	$1,400,000 j $81,739	$150,494	31-12-03	$17 for 1903	22-10-04	5¼%	$320 buyers
China Traders' Insurance Co., Ld.	1865	$2,000,000	24,000	$83.33	$25	$950,000 f $151,992 j $362,366 u $371,445	Nil.	30-4-04	$4½ for year ended 30-4-1904	8-12-04	6%	$75
North China Insurance Co., Ld.	1863	£150,000	10,000	£15	£5	T800,000	T217,119	30-6-04	Interim of 7/6 for 1905	1-5-05	8%	T82
Union Insurance Society of Canton, Limited	1867	$2,500,000	10,000	$250	$100	s $1,850,000 g £20,000 f $372,749 j $893,110 u $846,773	$2,078,997	30-6-04	$35 for 1903	21-1[illegible]-04	5%	$695
Yangtsze Insurance Association, Ld.	1862	$800,000	8,000	$100	$60	$750,000 j $50,000 f $5,890	$599,364	31-12-04	$12 and $3 special dividend for 03	12-4-05	8½%	$172½
Fire Insurances.												
China Fire Insurance Co., Ld.	1870	$2,000,000	20,000	$100	$20	$1,000,000 x $218,039 f $2,241	$260,374	31-12-04	$6 dividend and $1 bonus for 1903	10-3-05	8¼%	$87 sellers
Hongkong Fire Insurance Co., Ld.	1868	$2,000,000	8,000	$250	$50	$1,200,505	$360,372	31-12-04	$34 for 1903	7-3-05	11¼%	$300½
Shipping, Tug and Cargo Boats.												
China and Manila Steamship Co., Ld.	1882	$750,000	(1) 30,000	$25	$25	$5,000	$8,832	31-12-04	$1 for 1904	27-3-05	4¾%	$21
Douglas Steamship Co., Ld.	1883	$1,000,000	20,000	$50	$50	$185,000 i $85,439	Nil.	30-6-04	$2 for year ended 30-6-1904	29-9-04	5¾%	$35½ sales
Hongkong, Canton and Macao Steamboat Company, Ld.	1865	$1,200,000	80,000	$15	$15	e $250,000 d $600,000 f $158,444	$26,160	31-12-04	$1 for second half-year 1904	15-2-05	9½%	$27 sales
Indo-China Steam Navigation Company, Ld.	1882	£1,200,000	(2) 60,000	£10	£10	£100,000 i £205,000	£5,853	31-12-03	10/. @ 1/10 5-16=$5.37.82 for 1903	13-7-04	5½%	$96 sales
Shanghai Tug and Lighter Co., Ld. Do. Preference.	1903	T1,500,000	200,000 100,000	T50	T50	i T25,000	T43,762	31-12-04	Final of Tls 2¼ making Tls. 4½ / Tls. 1¾ making Tls. 3¼ for '04	1-3-05	7½% 7½%	T61 sales T50 sales
"Shell" Transport & Trading Co., Ld.	1898	£2,000,000	2,000,000	£1	£1	£400,000 i £4,116	£58,852	31-12-03	Interim of 1/. (Coupon No. 5) for '04	1-1-05	4½%	22/. sellers
"Star" Ferry Co., Ld.	1898 1900	$200,000	10,000 10,000	$10 $10	$10 $5	$65,000 i $24,257	$929	30-4-05	$1.80 / $0.90 cents for year ended 30-4-05	29-5-05	5¼% 3½%	$35 sellers $27 sellers
Straits Steamship Co., Ld.	1890	$500,000	(3) 5,000	$100	$100	$400,000 e $21,075 i $230,153	$21,231	31-12-04	$10 for 1904	12-3-05	8%	$137½ buyers
Taku Tug and Lighter Co., Ld.	—	T. T1,500,000	30,000	T. T50	T. T50	e T102,000 d T212,614	T6,190	31-12-04	T1¾ final making T3¼ for 1904	29-2-05	11%	T30 sales
Refineries.												
China Sugar Refining Company, Ld.	1878	$2,000,000	20,000	$100	$100	e $450,000	$42,812	31-12-04	Final of $15 making $20 for 1904	24-3-05	9¼%	$214 sellers
Luzon Sugar Refining Company, Ld.	1882	$700,000	7,000	$100	$100	none	Dr. $85,987	31-12-04	$3 for 1897	24-3-98	—	$31 sellers
Perak Sugar Cultivation Co., Ld.	—	T350,000	7,000	T50	T50	T100,000	T1,635	30-9-04	T2½ for year ending 30-9-04	17-12-04	3¾%	T71 sales
Mining.												
Chinese Engin'ring and Mining Co., Ld.	1901	£1,000,000	1,000,000	£1	£1	q £40,000	£7,820	29-2-04	No. 3 of ⅙	15-9-04	—	T8 sales
Oriental Consolidated Mining Co., Ld.	1901	G.$5,000,000	z 500,000	G. $10	G. $10	none	G. $672,093	31-12-04	Final of 50 cents making G.$1 for '04	30-12-04	5¾%	G. $17½
Raub Australian Gold Mining Co., Ld.	1892	£200,000	150,000 50,000	£1 £1	18/10 £1	£4,873	Dr. £4,029	31-3-04	No. 12 of 1/.=48 cents	28-1-01	—	$6 buyers
Société Francaise des Charbonnages du Tonkin	1888	F.4,000,000	16,000	F.250	F.250	l F307,740 a F1,529,652	F.87,333	31-12-03	Final of F.25, making F. 50 for 1903	1-9-04	—	$490

STOCKS	WHEN ESTABLISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation (PER CENT)	CLOSING QUOTATIONS
Docks, Wharves and Godowns.												
Farnham, (S. C.,) Boyd & Co., Ld......	1901	T5,520,000	55,200	T100	T100	T1,000,000	.........T34,924	30-4-05	Final of T8 making T13 for 1904/05	24-6-05	9¼%	T140 ex div. [buyers
Fenwick (Geo.,) & Gompany, Ld........	1889	$150,000	6,000	$25	$25	$70,000	..........$8,577	31-12-04	$3¾ for 1904..............................	13-3-05	11¼%	$33½
Hongkong and Kowloon Wharf and Godown Co., Ld........................	1886	$2,000,000	40,000	$50	$50	$250,000 q $58,423 i $10,000 y $300,000	.........$29,422	31-12-04	Final of $2½ making $5 for 1904....	11-3-05	5¼%	$95
Hongkong & Whampoa Dock Co., Ld.	1901	$2,500,000	50,000	$50	$50	i $33,500	........$498,289	31-12-04	$6 div. & $1 bonus for 2nd ½ year '04	21-2-05	7¾%	$194 buyers
Howarth Erskine, Ld...........	1901	$1,200,000	12,000	$100	$100	$60,000	—	30-6-04	$10 div. & $5 bonus for the year.....	8-04	5½%	$270 buyers
New Amoy Dock Co., Ld.....................	1892	$40,500	6,000	$6¾	$6¾	$55,500	..............$489	31-12-03	$1¼ for '03................................	5-5-04	7 %	$18 sellers
Riley Hargreaves & Co., Ld............	1899	$875,000	6,000	$100	$100	$150,000	.........$40,936	31-12-03	$10 div. and $2½ bonus for '03...	7-3-04	5 %	$245
Do. (Preference)............			2,750						$7 dividend .... for '03...		6¼%	$111½
Shanghai and Hongkew Wharf Co.......	1902	T3,200,000	32,000	T100	T100	b T487,210 r T59,880	.........T10,711	31-12-04	Final of T6 making T10 for '04...	30-3-05	5¾%	T175 sales
Tanjong Pagar Dock Co., Ld...............	1864	$3,700,000	37,000	$100	$100	$2,100,000	.........$206,645	31-12-04	$20 for second ½ year making $26 for '04..........................	20-3-05	7 %	$375
Yangtsze Wharf and Godown Co., Ld..	1902	T250,000	2,500	T100	T100	T17,500	..........T2,762	31-12-05	T18 for '04..................................	29-3-05	9¼%	T190
Lands, Hotels and Buildings.												
Astor House Hotel Co., Ld. (Shanghai)	1901	$750,000	(4) 30,000	$25	$25	none	..............$9,989	30-6-04	$2½ for year ending 30-6-04.........	30-8-04	8 %	$31½ buyers
Astor House Hotel, Ld. (Tientsin)	—	T. T100,000	2,000	T. T50	T. T50	T34,000 e T8,000	.... T806	29-2-05	Final of T5 making T9 for the year.	20-4-05	6½%	T140 sellers
Central Stores, Ld..........................	—	$91,845	6,000	$15	$12	$20,000	..........$1,502	31-12-04	Final of 60 cents making $1.80 for 04..	30-3-05	8¾%	$21 sellers
Do. (Founders')............			123	$15	$12				None...	—	—	$100
Do. (New Issue)...............	1904	$360,000	24,000	$15	$7½				Preferential of 7% for '04.............	30-3-05	7 %	$7½ buyers
Hongkong Hotel Co., Ld.	1866	$600,000	12,000	$50	$50	$100,000 r $10,000	..........$3,554	31-12-04	$5 for 2nd half-year making $10 for '04..................................	30-3-05	7 %	$142
Hongkong Land Investment and Agency Co., Ld.	1889	$5,000,000	50,000	$100	$100	e $250,000	..........$37,875	31-12-04	Final of $6 making $12 for '04..........	31-1-05	10½%	$115
Hotel des Colonies Co., Ld. (Shanghai)	1902	T225,000	9,000	T25	T25	n T20,986	.... T7,202	31-3-05	T2½ for the year ending 31-3-05.....	18-5-05	13 %	T19 sales
Hotel Metropol Company, Limited......	1904	$200,000	2,000	$100	$100	—	........First	year	Interim of $4.................................	26-1-05	—	$105
Humphreys' Estate & Finance Co., Ld.	1887	$1,500,000	150,000	$10	$10	i $200,994 e $50,000	.........$11,958	31-12-04	90 cents for '04............................	11-2-05	7 %	$12¾ sellers
Kowloon Land and Building Co., Ld. ..	1889	$300,000	6,000	$50	$30	none	.... $377	31-12-04	$3 for '04......................................	31-1-05	7½%	$40 sellers
Shanghai Land Investment Co., Ld......	1901	T2,600,000	52,000	T50	T50	T828,813 e T170,000	.........T40,066	31-12-04	T3 final & T2 bonus making T8 for '04................................	16-2-05	6¾%	T121 buyers
Tientsin Hotel des Colonies, Ld.	1903	T70,000	1,400	T50	T50	none	.... T670	31-12-04	T5 for '04.................................	1-3-05	10½%	T47 sellers
Tientsin Land Investment Co., Ld.......	1902	T772,600	7,726	T100	T100	i T67,300	.... T725	31-12-04	T4 final making T7 for '04...........	29-2-05	5½%	T125 sellers
Wei-hai-wei Land and Building Co., Ld.	1899	T91,850	3,764	T25	T25	none	T687	31-12-04	None	—	—	T12 buyers
West Point Building Co., Ld.	1889	$625,000	12,500	$50	$50	none	..........$1,247	31-12-04	Final of $1.70 making $3.20 for '04...	31-1-05	5½%	$55 sellers
Cotton Mills.												
Ewo Cotton Spinning and Weaving Co., Ld.	1895	T750,000	15,000	T50	T50	none	.........T12,844	31-10-04	T4 for year ended 31-10-03.............	22-12-03	9¾%	T41 buyers
Hongkong Cotton Spinning, Weaving and Dyeing Co., Ld..................	1901	$1,250,000	125,000	$10	$10	none	.........$22,862	31-7-04	50 cents for year ended 31-7-04	12-9-04	3 %	$16½ sellers
International Cotton Manufacturing Co., Ld.	1895	T750,000	(5) 10,000	T75	T75	T50,000	.........T13,629	30-9-04	Interim of 3% a/c 1898..................	30-4-98	—	T40 buyers
Laou-kung-mow Cotton Spinning & Weaving Co., Ld.	1895	T800,000	(6) 8,000	T100	T100	none	.........T10,000	31-12-04	Interim of 4%a/c1898on6,000shares	1-8-98	—	T42½ sales
Soy Chee Cotton Spinning Co., Ld.	1895	T1,000,000	2,000	T500	T500	l T5,658	.........T22,051	31-12-04	4% for 1897..................................	2-2-98	—	T180
Cigar and Tobacco Cos.												
Alhambra, Limited............................	1898	$60,000	300	$200	$200	none	Dr. $2,584	31-12-04	$125 for year ending 30-6-1900.......	15-8-01	—	$100
Philippine Company, Limited............	1904	$675,000	67,500	$10	$10	—	—	—	First year....................................	—	—	$9½ sellers
Shanghai-Sumatra Tobacco Co., Ld. ...	1902	T600,000	(7) 30,000	T20	T20	T24,820 v T25,000	.........T1,297	31-10-04	Final of T6 making T9..........	8-3-05	13½%	T68 sales
Miscellaneous.												
Anglo German Brewing Co., Ltd.	1905	$400,000	4,000	$100	$100	—	—	—	First year....................................	—	—	$125 sellers
Bell's Asbestos Eastern Agency, Ld......	1895	£5,377.10s	8,604	12/6	12/6	none	..............£161	31-12-03	6d. per share for '03.....................	21-7-04	5 %	$5½ buyers
Campbell, Moore & Co., Ld................	1886	$12,000	1,200	$10	$10	$8,000	..........$1,182	31-12-04	$3 for 1904	1-4-05	8¼%	$36
China-Borneo Co., Ld.......................	1903	$720,000	(8) 60,000	$12	$12	none	—	31-12-04	$1 for 1904	17-3-05	8½%	$12 sellers
China Flour Mill Co., Ld.	—	T200,000	4,000	T50	T50	T30,000	..............T718	31-12-04	T5 for 1904	24-3-05	8 %	T64 sellers
China Light and Power Co., Ld.	1901	$300,000	30,000	$10	$10	none	.... $3,739	29-2-04	None	—	—	$10
China Provident Loan and Mortgage Co., Ld.	1898	p$1,000,000	100,000	$10	$10	$80,000	..........$1,581	31-12-04	80 cents for 1904.................	18-1-05	9¼%	$8¾ sales
Dairy Farm Company, Ld..................	1896	$187,500	25,000	$7½	$6	—	—	31-7-04	$1¼ for year ending 31-7-03..........	20-11-03	—	$17 sellers

STOCKS	WHEN ESTAB-LISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation* PER CENT	CLOSING QUOTATIONS
Miscellaneous.—Continued												
Fraser & Neave, Ld.	1898	$225,000	4,500	$50	$50	$112,500	$2,706	31-12-03	$5 dividend and $2½ bonus for '03	26-3-04	½ %	$100
Green Island Cement Co., Ld.	1889	$1,500,000	150,000	$10	$10	$400,000 *y* $50,000	$95,054	31-12-04	$2 for 1904	27-2-05	7½%	$26½
Hall & Holtz, Ld.	—	$420,000	(*9*) 21,000	$20	$20	$186,000	$7,551	29-2-05	Final of $1½ making $2½	15-4-05	9¼%	$27 buyers
Hongkong and China Gas Co., Ld.	1864	£70,000	7,000	£10	£10	£23,109 *f* £3,000	£7,625	31-12-03	Final of 6% & bonus of 1% making 22s. for 1903	25-5-04	7½%	$170 buyers
Hongkong Electric Co., Ld.	1889 1899	$600,000	30,000 30,000	$10 $10	$10 $5	none	$1,747	30-4-04	$1.00 50 cents } for year ending 30-4-04	18-7-04	5¾% 4½%	$17¾ $11½ sellers
Hongkong High-Level Tramways Co., Ld.	1887	$125,000	1,250	$100	$100	$50,000	$2,796	30-11-04	$15 for year ending 30-11-04	24-12-04	7 %	$212½ buyers
Hongkong Ice Company, Ld.	1881	$125,000	5,000	$25	$25	*k* $60,000	$5,356	31-12-04	Final of $13 making $17 for 1904	14-2-05	7 %	$242½
H'kong Rope Manufacturing Co., Ld.	1883	$500,000	10,000	$50	$50	$60,000	$11,137	31-12-04	$10 for 1904	10-4-05	7 %	$152 buyers
Hongkong Steam Waterboat Co., Ld.	1900	$150,000	15,000	$10	$10	$2,500	$299	30-9-04	Interim of 50 cents for half year ended 31-3-1905	3-6-05	12 %	$16
Katz Brothers, Ld.	1896	$1,000,000	10,000	$100	$100	$475,000	$3,400	31-12-04	$8 for 1904	...-3-05	6 %	$135 buyers
Lane, Crawford & Co., Ld. (Shanghai).	1903	$250,000	2,500	$100	$100	none	$21,582	29-2-04	Interim of $5	19-11-04	7¼%	$145 buyers
Maatschappij tot Mijn-, Bosch- en Landbouwexploitatie in Langkat	1902	G.2,500,000	25,000	G.100	G.100	T528,210 T19,465	T35,849	31-10-04	2nd quarterly dividend of T5 making so far T12½ for '05	15-6-05	16¾%	T210 sellers
Maynard & Co., Ld	1901	$34,000	3,400	$10	$10	none	—	31-10-04	$2 for year ended 31-10-04	3-12-04	9 %	$23
Mondon, (E. L.) Ld	1902	T350,000	7,000	T50	T50	none	*Dr.* T117,638	31-12-04	T5 for 1902	2-5-03	—	T25
S. Moutrie & Company, Limited	1899	$200,000	4,000	$50	$50	$5,000	$832	30-6-04	Final of $3 making $5 for year ending 30-6-04	28-12-04	9 %	$54 sales
Shanghai and Hongkong Dyeing and Cleaning Co., Ld.	1903	$60,000	1,200	$50	$50	none	*Dr.* $5,537	31-8-04	None	—	—	$50
Shanghai Gas Co., Ld.	1903	T800,000	16,000	T50	T50	*q* T145,000 T108,172	T8,011	31-12-04	T3½ final and T1½ bonus making T8½ for '04	8-3-05	7 %	T122½ buyers
Shanghai Horse Bazaar Co., Ld.	1904	T270,000	5,400	T50	T50	T45,000	T10,247	31-12-03	T5 for 1903	8-4-04	6 %	T82½ sales
Shanghai Pulp and Paper Co., Ld.	—	T450,000	4,500	T100	T100	T25,000	T6,968	31-12-04	Final of T8 making T14 for '04	28-2-05	8¼%	T167½ sales
Shanghai Waterworks Co., Ld.	1881	£144,000	7,200	£20	£20	T170,000	T17,220	31-12-04	Final of 37/6 making 52/6 for '04	6-4-04	4¼%	T450 buyers
Singapore Dispensary, Ld.	1891	$30,000	600	$50	$50	$20,000	$1,769	31-7-04	$6¼ for year ended 31-7-04	19-9-04	7¾%	$80 sellers
South China Morning Post, Ld.	1903	$150,000	6,000	$25	$25	none	*Dr.* $5,068	29-2-05	None	—	—	$25
Steam Laundry Co., Ld.	1902 1904	$75,000	5,000 10,000	$5 $5	$5 $5	none	$3,644	31-5-04	60 cents for year ended 31-5-04 First year	2-8-04 —	7¾% —	$8 buyers $7½ buyers
Straits Ice Company, Ld.	1884	$200,000	2,000	$100	$100	$25,000	$700	31-12-04	$10 for second half year '04	...-2-05	13¼%	$150 buyers
Straits Trading Co., Ld.	1887	$2,500,000	250,000	$10	$10	$750,000 *e* $50,000	$84,813	30-9-04	$1 dividend and 35 cents bonus for half year ended 31-9-04	9-12-04	6¼%	$40¾
Tientsin Native City Waterworks Co., Ld.	1902	T356,000	3,560	T100	T100	none	T2,025	31-12-04	T2 for 2nd half year '03	9-3-04	—	T. T100
Tientsin Waterworks Co., Ld.	1901	T. T200,000	2,000	T. T100	T. T100	T15,259	T2,211	30-4-04	Final of T4 making T8 for '03/4	20-6-04	6½%	T. T125
United Asbestos Oriental Agency, Ld. Do. do. (Founders')	1896	$100,000	9,900 100	$10 $10	$4 $10	$20,000	$480	31-5-04	90 cents $29.70 } for year ended 31-5-04	6-8-04	9¼% 16¾%	$9½ sellers $180 buyers
Watkins, Limited,	1899	$100,000	10,000	$10	$10	*e* $4,802	$12,604	31-12-04	$1 for 1903	28-3-04	—	$8 sellers
Watson (A. S.) & Co., Ld.	1886	$900,000	90,000	$10	$10	$300,000 *e* $25 000	$6,096	31-12-04	Final of 50 cents making $1 for '04.	29-5-05	8 %	$12½ sales
William Powell, Ld.	1901	$120,000	12,000	$10	$10	*e* $3,000	$588	30-6-04	Interim of 50 cents for year 1094/5.	10-4-05	10½%	$11¾ sellers

LOANS AND DEBENTURES	AGENTS FOR THE LOAN	AMOUNT OF LOAN	PAR VALUE	OUT-STAND'G BONDS	WHEN PAYABLE.	CLOSING QUOTATIONS	
Chinese Government, 7 per cent. Silver Loan 1886 E.	Hongkong Shanghai Bk. Cor.	T767,200	T250	1969	Mar. 31st & Sept. 30th each year until Mar. 31st, 1917.	par.	Plus accrued interest
Hongkong Hotel Co., Ltd., 6% Mortgage Debentures of 1899‡	Hongkong Shanghai Bk. Cor.	$500,000	$500	§ all	Half yearly, June 30th and December 31st	par.	Plus accrued interest
Shanghai & Hongkew Wharf Company Ltd. 6% Debentures of 1902	Hongkong Shanghai Bk. Cor.	T543,900	T100		Half yearly, June 30th and December 31st	T97	Plus accrued interest
Astor House Hotel Co. Ltd. 8% Debentures of 1903	Hongkong Shanghai Bk. Cor.	T500,000	T100		Half yearly, January 1st and July 1st	T105	Plus accrued interest
Chinese Engineering & Mining Co., Ltd., 6 per cent Debentures of 1902†		£500,000	¶	£480,000	Half yearly, June 30th and December 31st	par.	Plus accrued interest
International Cotton Manufacturing Co. Ltd. 6% Debentures of 1901	Russo Chin. B.	T500,000	T100		Half yearly, March 31st and September 30th	par.	Plus accrued interest

a Amortisation Fund.
b Building Reserve Account.
c Capital Reserve Fund.
d Depreciation and Insurance Fund.
e Equalization of Dividend Fund.
f Exchange and Investment Fluctuation Account.
g Gold Reserve Fund
h Exchange Reserve Account.
i Insurance Fund.
j Reinsurance Fund.
k Contingencies Account

l Legal Reserve Fund.
m
n Sinking Fund.
o
p Authorized capital $2,000,000.
q Depreciation and Repair Fun.
r Repairs and Renewals Account.
s Silver Reserve Fund.
t
u Underwriting Suspense Account.
v Special Works Fund.

w
x Extra Reserve Fund.
y Premium on New Issue.
z 75,000 owned by the Company.
1 5,725 shares unissued.
2 First issue of 60,000 of which 10,411 unallotted.
3 785 shares unissued.
4 7,600 shares unissued.
5 1,616 shares unallotted.
6 842 shares unallotted.
7 Only 13,000 shares issued.

8 14,000 shares unissued.
9 399 shares unissued.
* Based on last year's dividend.
§ 270 held by the Company.
¶ In certificates of £20 and £100
‡ Redeemable in 10 years, or at option of Company the Company giving 6 months' notice.
† Redeemable at par at rate of £10,000 per annum from 31st December, 1903, to 31st December, 1952.
Dr. Deficit.

SINGAPORE SHARE QUOTATIONS.

COURTESY MESSRS. FRASER & CO. BROKERS, SINGAPORE, JULY, 1905.

NAME	DATE OF FORMATION	CAPITAL	CAPITAL PAID UP	NO. OF SHARES	ISSUE VALUE	PAID UP	RESERVE	LAST DIVIDEND	SINCE LAST MAIL HIGHEST	SINCE LAST MAIL LOWEST	CLOSING QUOTATIONS
Mining.									$	$	$
Bersawah Gold Mining Co., Ld.	1900	$175,000	115,000	13,500 *1*	10	7.50					13.00 sellers
" " " " *Deferred.*				4,000	10	10					8.00 sellers
Bruseh Hydraulic Tin Mining Co., Ld.	1901	$600,000	600,000	60,000	10	10					4.00 buyers
Kadana Gold Mining Co., Ld.	1901	$300,000	220,000	20,000	10	10					10.00 nominal
" " " " *Pref.*				10,000	10	10					10.00 "
Kechau Goldfields, Ld. *Fully paid*	1902	£30,000	£16,175	6,207	1	1					8.00 sellers
" " " *Contrib.*				10,493 *2*	1	19/-					7.50 sellers
Pahang Corporation Ld.	1889	£250,000	244,306	244,306	1	1	20,000	3 per cent for year ending 30 6-02	4.10	4.00	4.00 sellers
Pahang Kabang Ld.	1890	£375,000	366,000	360,000	1	1			0.75	0.72½	0.72½ sales
" " " *Pref.*				15,000	1	1					...... nom.
Queensland Raub G. M. Co., Ld. *Fully paid*	1901	£146,700	100,866	36,700	1	1					...... nom.
" " " " *Contrib.*				110,000	1	11/8					0.30 sellers
Raub Aust. Gold Ming. Co., Ld. *Fully paid*	1892	£200,000	191,250	50,000	1	1	4,873	1s. paid January, '01			5.50 nom.
" " " " *Contrib.*				150,000	1	18/10		1s. " " "	5.50	5.25	5.50 sales
Redjang Lebong Mining Co.	1898	£2,000,000	1,800,000	20,000 *3*	100	100		22 9-10% for year ending 31-12-04	265.00	260.00	265.00 sellers
Royal Johore Tin Mining Co., Ld.	1900	$220,000	220,000	22,000	10	10		5 " for year ending 15-2-04			3.00 sales
Sipiau Tin Co., Ld.	1899	$230,000	230,000	23,000	10	10		5 " for ½ year ending 30 6-03			4.25 buyers
The Belat Tin Mining Co., Ld.	1903	$300,000	300,000	30,000	10	10					7.00 sellers
Tronoh Mines, Ld.	1902	£160,000	149,185	160,000 *5*	1	1		1/6 paid April '05	20.25	19.75	20.00 sales
Duff Development Co., Ld.	1903	£400,000	£350,000	400,000 *6*	1	1					10.00 sellers
Rubber.											
Bukit Rajah Rubber Co.		£70,000	£61,000	70,000 *13*	1						£2.15s.od. sellers
Balgownie Rubber Co.		$200,000	$100,000	20,000	10	5					$8.00 sellers
Cicely Rubber Estates Co.		£6,000	£6,000	6,000 *14*	1						£1. 2s. od. ......
" " " 5% Pref.		£6,000	£4 500	6,000	1						£1.15s. od. sellers
Pataling Rubber Estate Syndicate	1903	£30,000	£17,500	30,000 *15*	1	1/5		Mortgage £5,000			£2.10s. ......
Ribu Planting Co. Ld.	1904	$200,000	135.000	2.000 *16*	100	100					$200.00 sellers
Sandycroft Rubber Co.	1904	$100,000	$85,000	1,000 *17*	100	100					$125.00 buyers
Selangor Rubber Co. Ltd.	1898	£30,000	£26,000	26,000 *18*	1	1					£5. 5s. od. buyers
Singapore & Johore Rubber Co. Ld.	1903	$100,000	$70,250	150	100	100					$100.00 sellers
				850	100	65					
Sungei Way Rubber Co.	1904	£50,000	£13 920	50,000	1	4/-					£1 0s. od. sales
Vallambrosa Rubber Co.		£60,000	£50,000	60,000	1						£2.10s 6d ......
General.											
Fraser & Neave, Ld.	1898	$225,000	225,000	4,500	50	50	112,500	10 p. ct. and 2½ per cent bonus for '04			100.00 buyers
Hogan & Co., Ld.	1904	$480,200	331,800	3,348	100	100	5,000	7 per cent March 1905			85.00 sellers
H'kong and Shanghai Banking Corporation	1865	£10,000,000	10,000,000	80,000	125	125	10,000,000 *9* 6,500,000 250,000 *10*	30s. div. and 10s. bonus at 1-11-9-16 =$25.46.42 per share for ½ year ending 31-12-04			745.00 buyers
Howarth Erskine, Ld.	1901	$1,200,000	1,200,000	12,000	100	100	140,000	10 & 5 p. ct. bon. for yr. end 30-6-04			270.00 sellers
Maynard & Co., Ld.	1901	$34,000	34,000	3,400	10	10		20 per cent for year ending 31-10-04			23.00 sellers
Riley, Hargreaves & Co., Ld.	1899	$875,000	875,000	6,000	100	100	150,000	10 p. ct. and 2½ p. ct. bon. for year '04			250.00 sales
" " " 7% Pref.				2,750	100	100		7 p. ct. for year 1904			115.00 buyers
Singapore Cold Storage Co., Ltd.	1903	$600,000	240,000	25,000	10	10					8.50 sellers
Singapore Dispensary Ld.	1891	$30,000	30,000	600	50	50	19,000	12½ per cent for year ending 31-7-04			75.00 buyers
Straits Ice Co., Ld.	1884	$200,000	200.000	2,000	100	100	22,000	5 " interim for 1905			150.00 buyers
Straits Steam Ship Co., Ld.	1890	$500,000	421,500	5,000 *7*	100	100	400,000 169,228 *11*	10 p. ct. per year ending 31-12-04			142.50 buyers
Straits Trading Co., Ld.	1887	$3,000,000	2,500,000	300,000 *8*	10	10	700,000 1,021,395 *12*	10p.ct. & 50cts. bon. ½ yr. end 31-3-05	40.75	42.50	40.75 sales
Tanjong Pagar Dock Co., Ld.	1864	$3,700,000	3,700,000	37,000	100	100	1,950,000	$20 for half year ending 31-12-04	385.00	380.00	385.00 sales
Debentures.											
Howarth Erskine Ld. 7 per cent ... 250,000											3 per cent prem.
Singapore Municipal 6 " ... 400,000											... " nominal
" " 5 " ... 1,878,000											1 " prem. buyers
" " 4 " ... 655,500											2 " dis. nominal
Riley Hargreaves & Co., Ld. 6 p. cent 225,000											3 " prem. buyers
Tanjong Pagar Dock Co., Ld. 6 " 250,000											2 " prem. sales
" " " " 5 " 1,365,500											1 " prem.

1 3,500 unissued. *2* 13,300 " *3* 2,000 "
4 35,000 unissued. *5* 10,815 " *6* 50,000 "
7 785 unissued. *8* 50,000 " *9* Special Gold Reserve Fund.
10 Insurance Fund. *11* Sundry Reserves. *12* Sundry Reserves.
13 9,000 unissued. *14* 1,500 " *15* 12,500 "
16 650 unnisued. *17* 150 " *18* 4,000 "

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FAR EASTERN REVIEW

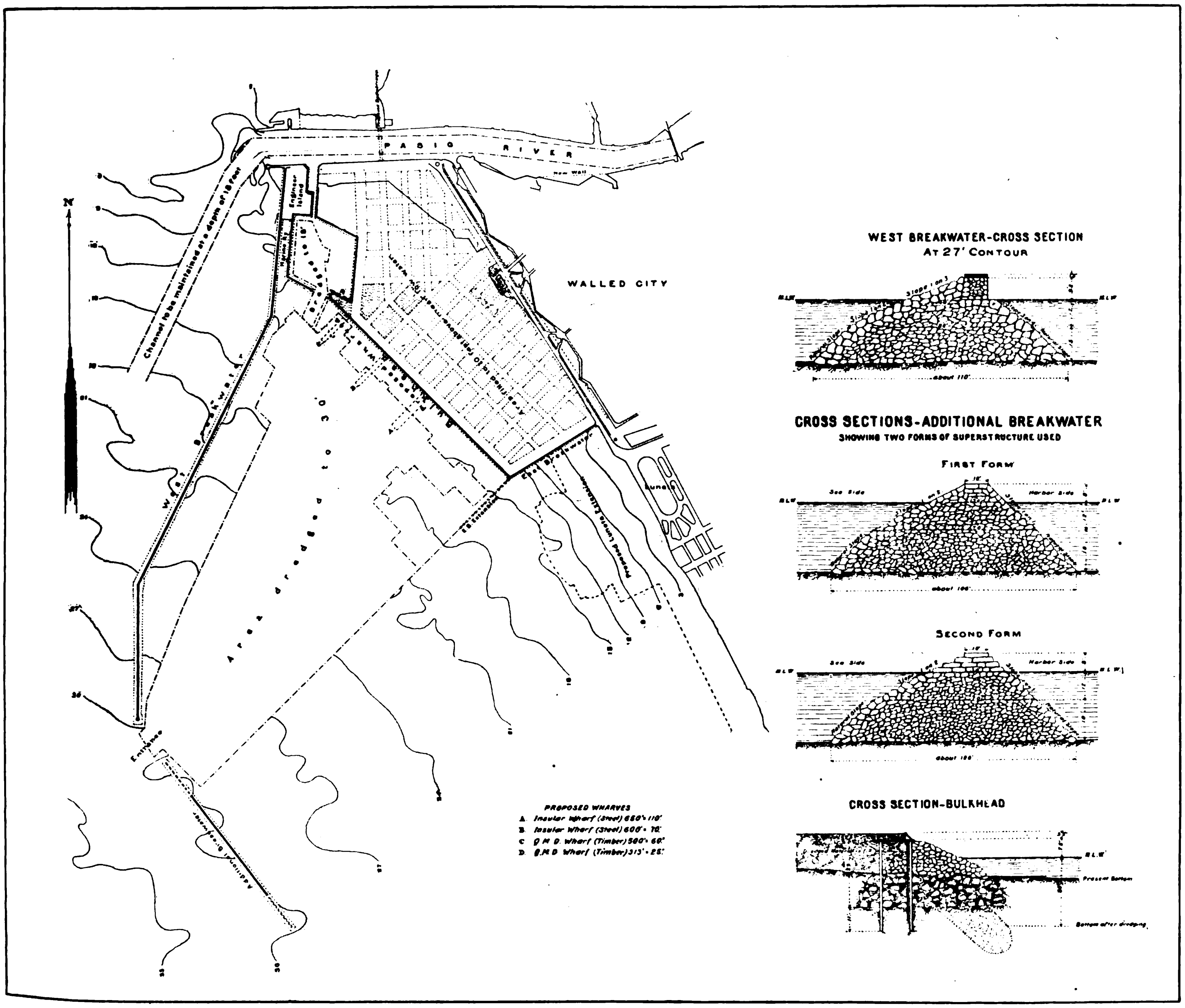
COMMERCE ⊛ ENGINEERING ⊛ FINANCE

VOL. II. MANILA, P. I., AUGUST, 1905. No. 3.

STEEL PIER CONSTRUCTION, MANILA PORT WORKS

Bids are about to be advertised for by the Philippine Government for the construction of two steel piers in connection with Manila harbor improvement scheme, which has been under way for more than two years. The piers have been located with reference to future demands of shipping on port accommodations. Space has been reserved along the bulkhead of the reclaimed area abutting upon Malecon Drive for five piers in addition to those now in contemplation. Provision has also been made by the engineers for the long-talked-of Luneta extension, which is part of the Burnham plan of parking the city, and this extension will be reclaimed from the harbor by the Atlantic, Gulf and Pacific Company, in addition to which the contracting firm will cover the tract of land it already has reclaimed, with about 3 ft. more of harbor dredgings, which, when it is drained and permanently settled, will give the reclamation a surface height over the present measurement of about 2½ ft.

FUTURE PIER-SIDE BERTHING FACILITIES.—After the final dredgings have been finished the water area of the harbor improvement will have a uniform mean depth of from 30 ft. to 31 ft., which will give to practically all ships calling at this port pier-side accommodation. Even the mammoth steamer *Manchuria* will



MANILA PORT WORKS.—GENERAL PLAN OF HARBOR ACCORDING TO EXISTING (AMERICAN) PROJECT

(Continued on page 60)

FAR EASTERN REVIEW

COMMERCE :-: ENGINEERING :-: FINANCE

A MONTHLY REVIEW OF FAR EASTERN TRADE, FINANCE, AND ENGINEERING. DEDICATED TO THE INDUSTRIAL DEVELOPMENT AND ADVANCEMENT OF TRADE IN THE PHILIPPINES AND FAR EASTERN COUNTRIES.

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MANILA AND SHANGHAI, AUGUST, 1905

THE TAFT PARTY.

The Secretary of War and his distinguished party are now in the Philippine Islands, and in the intervals between dinners, banquets and other functions will be able to see a little of the country and form ideas which will serve as the basis for individual or party action the next session of Congress. Secretary Taft has fulfilled his promise to the people of the Islands, and through thick and thin has championed their cause, even when his Americanism has been doubted and challenged by the interests opposed to the fair treatment and justice for us, characterizing his campaign.

The Railroad Bill, the Insular Tariff and other measures for our benefit have been successfully passed, but the main tariff bill, the most important of all, has twice been defeated in the closing days of the last two sessions. Despite this defeat, the Administration has again declared its intention, through the Secretary of War, not to give up the struggle until absolute free trade, or a substantial reduction on our two staples, has been secured, and true to its past efforts the Opposition has determined to carry on the fight until the Philippines are relegated to growing cocoanuts and century plants.

When we remember who were our most bitter opponents in the debates on the tariff, and mainly responsible for the failure of the bill, and when we glance over the list of names comprising the party now in the Islands, we can more fully appreciate the work of the Secretary of War and the advantages which must accrue to the Islands from his selection of the personnel of the party.

There are many minor issues still pending for the development of the Philippines, but the main issue towering above all others, and the one which is first and foremost in the minds of the party, is that of the tariff. Without this boon, all other concessions are worthless. The tariff bill reduces down to a question of sugar and tobacco, and it is to be hoped and trusted that too many minor necessities will not be brought forward by over zealous interests to cloud the more important point.

It is hardly to be expected that every member of the party will depart with favorable ideas and impressions of our needs, for it is entirely logical to suppose that some of them will employ the opportunity to strengthen their argument, and complete the case which will mean a prolongation of our industrial depression. At the same time, however, there are in the party those who will view conditions from our standpoint, and offset and possibly overmatch the other element. We note that Senators Dubois and Foster, champions of the beet and cane sugar interests, are in the party, and their observations will, no doubt, be strengthened by the more practical conclusions drawn by the Hon. Emile Godchaux, one of the leading cane sugar planters in Louisiana, whose estate is a model among the factories of the world.

This one fact is evidence that the Opposition has come to study the industry at first hand, fortifying the arguments of their senatorial champions by the advice of the brightest experts in the world. This situation is one which is welcome to those having the interests of the Philippine Islands at heart, as heretofore the campaign against us has been based entirely upon contradictory information from parties having only a superficial knowledge of the industry, and from similar official reports.

As the main objective of the party is the acquisition of ideas and information bearing on the tariff, which means SUGAR, we are confident that the result of this visit will be somewhat in the nature of a surprise over the actual condition of the industry, and a more favorable tendency to do the right thing by the Islands in the future.

Mr. Godchaux will be the first to see that the industry is seventy years behind the times, and on a lower scale even than the old Muscovado estates which are still in evidence through the West Indies, and that the menace to the home beet and cane industry is a long way off. The only conclusion he can arrive at, as a sugar expert, is that we need new capital and new methods, and that this will be denied us as long as the high protective tariff is in force.

A comparison of his own magnificent estate with the best Filipino outfit will satisfy him that the art of making sugar in the Philippines is a burlesque on the industry as it stands today; but such as it is it represents the capital of many small planters, and the hope of the Islands for brighter days to come.

OUR PUBLIC LAND ACT.

A Manila subscriber to THE FAR EASTERN REVIEW, who is an earnest champion of the colonization of the agricultural districts of the Philippine Islands by Americans as the only salvation of the country, makes the following request upon this paper:—

"*Editor of* THE FAR EASTERN REVIEW:—

In view of the fact that the legislators who are now in the Islands with Secretary Taft seem to be seeking all the information possible about the country and its conditions, will you kindly publish for their information the important features of the Public Land Act? I believe this law will appeal to them as being too narrow to admit of our agricultural rejuvenation. At the banquet to Mr. Taft and his party the other night, by the combined chambers of commerce, Senator Foster of Louisiana hit the nail on the head when he said that every foot of soil in the Philippine Islands is American territory. This being the truth, should we not have land laws broad and generous enough to attract American capital and the American pioneer farmer to the land? This policy can only revive our agriculture.—(Signed) *A. J. M.*"

Under the Public Land Act, No, 926, which was proclaimed in force in the Philippine Islands July 26th, 1904, individuals, co-partnerships and corporations may purchase agricultural public lands at auction, and have five years in which to pay the purchase price.

This law, with special reference to purchase by corporations, is interesting. Agricultural public land is the only kind that may be purchased under the law. Land that contains any valuable deposits of coal, salts, or any kind of valuable mineral may not be purchased. The land must be more valuable for agricultural than for forestry, mining, or any other purpose.

The corporation must be organized under the laws of the Philippine Islands, or of the United States, or some state, territory, or insular possession of the United States. Such an organization may purchase not exceeding one thousand and twenty-four *hectares*, or about 2,500 acres, of land, and if organized to engage in agriculture must be limited by its charter to the ownership and control of not exceeding that area. It is unlawful for any member of a corporation engaged in agriculture to be in any wise interested in any other corporation engaged in agriculture, and it is also unlawful for any corporation organized for any purpose except irrigation, to be in any wise interested in any other corporation which is engaged in agriculture.

Any corporation organized in any of the American states, territories, or insular possessions, that is, any corporation organized in American jurisdiction outside of the Philippine Islands, is a foreign corporation here, and must comply with the Philippine laws governing the transaction of business in the Philippine Islands by foreign corporations. No other foreign corporation can purchase land from the state.

The Spanish Government seems never to have made any general or connected system of survey of the public domain of the Islands, and the present government has not yet undertaken such a survey. Hence, neither the extent nor the location of the public lands of the Philippines is definitely known, and no maps showing the location of such lands as are subject to sale under the law can be furnished by the government.

All lands purchased by corporations, when the tract is of more than 64 *hectares*, must be taken, wherever it is possible, in contiguous squares of not less than 64 *hectares* each. But a purchaser of one or more tracts of 64 *hectares* may also take, in connection therewith, one rectangular tract of 32 *hectares*, provided the longer side of such smaller tract is contiguous to the square tract of 64 *hectares*, or to one such 64 *hectare* tract, if more than one be purchased.

Sales will not be made of tracts of land lying in such manner as to give the purchaser control of any adjacent land, water, stream, shoreline, way, roadstead, or other valuable right, to the prejudice of the interests of the public.

A purchaser of public land is required under the law to actually occupy, cultivate, and improve the land for five years, and when the patent is issued the title is guaranteed by the government under the Torrens Land Law which is in force in the Islands.

Applications to purchase agricultural public land should be made to the Chief of the Bureau of Public Lands, Manila, and as soon as an application is approved, the sale ordered, and an appraisement made, that official will advertise for bids for the land, and then the applicant and any other qualified company may submit bids. The bidder must enclose with his sealed bid a certified check, or a post-office money order, payable to the order of the chief of the land bureau, for 65 per

cent of the amount of his bid. Any bid for less than the appraised value of the land, which may not be less than -P-10 ($5) per *hectare*, will not be considered. The land is to be awarded for purchase to the highest qualified bidder, but, if, upon opening the bids it is found that the highest price is offered by more than one bidder, and one of such tie bidders is the original applicant, then such original applicant is entitled to be awarded the land. If, however, the original applicant is not one of such tie bidders, then the land will be at once put up for oral bidding and awarded for purchase to the highest qualified bidder.

The balance of the purchase price of the land, after deducting the 25 per cent deposited with the bid, may be paid in full at the time of making the award, or may be paid in equal annual installments. or may be paid in one installment at the expiration of five years from the date of the award. All sums remaining unpaid after the date of the award will bear 6 per cent interest per annum from that date until paid.

A corporation or like association of persons may make but one purchase of the maximum amount of land, 1,024 *hectares*. A corporation or association, any member of which has purchased any land under the law, either as an individual or as a member of any other corporation, will not be permitted to purchase.

Patents are not to be issued until after five years from the date of the award, and during that five years the purchaser must occupy, cultivate, and improve the land, and may not sell the land or in any manner encumber the title.

THE CHINESE BOYCOTT.

It may safely be said that in spite of the prompt action of President Roosevelt in compelling American emigration officers to place a more liberal construction on the exclusion laws against the Chinese, the boycott of American goods—in fact, everything American—throughout the Far East, by the Chinese, is going on apace. From Tientsin clear around to the Federated Malay States and the Straits Settlements come reports of activity in Chinese circles against American interests. And right here in Manila, where the Chinese are doing business under the protection of the American Government, the boycott is on—silent in its operations, of course, but a boycott all the same. Here in Manila the Cantonese Society, which represents probably all the big local Chinese interests, as well as those throughout the provinces, is the factor Americans have to contend with. Chinese boards of trade and other commercial bodies at first sought to induce the Cantonese Society to declare open boycott against our interests. This the society, after careful consideration, decided it could not do, being as it is under the protection of the American Government; but it did decide, and so informed the commercial bodies in the homeland, to lend to the movement its moral and financial support. We have it from a reliable source that this *moral* support is nothing short of a secret boycott, and that the Chinese have kept their work to lend financial assistance to the movement in China by sending large sums of money over there in the interest of the campaign.

It is impossible at this time to correctly determine what this antitrade movement against the Americans will mean in the way of financial loss to the exporters of the United States. Already Transpacific shipping interests, controlled by American capital, are feeling to a marked degree the effects of the boycott. If all reports are true American bottoms are calling at China ports in vain for native cargo. Merchants in China have ceased to even talk about when they may resume trade relations with the importing houses that handle American goods, and so violent has the agitation become in some trade centers that threatening demonstrations against American consulates, etc., by the ignorant classes, are of almost daily frequence. All this, in the face of instructions to the viceroys from the Peking Government to prohibit, and if necessary, forcibly, prevent the continuance of the boycott and violent anti-American demonstrations awaiting result of negotiations which are now pending between the Washington and Peking officials.

We gather from advices in the daily papers that President Roosevelt has entered upon a settlement of the Chinese grievances with that same strenuosity that characterizes all his diplomacy. By his direction the State Department has "put the matter up" to the consular and immigration officials "straight from the shoulder." These public servants (included in the latter class being those of the Philippine Islands), have been informed that the law and new regulations for carrying it out "must be enforced with the utmost care." The President informs them that "they will be held to a rigid accountability for the manner in which they perform this duty." Diplomatic representatives in China are cautioned not to sign certificates for departing Chinese without first making a rigid examination into the merits of the case, and, according to the San Francisco correspondent of *The South China Morning Post*, emigration officials are ordered to make a radical change of policy and accept such certificates as evidence of the Chinese's right to land in American territory "unless there is good reason to assume fraud." President Roosevelt says:

"Under the laws of the United States and in accordance with the spirit of the treaties negotiated between the United States and China, all Chinese of the coolie class, that is, all Chinese laborers, skilled and unskilled are absolutely prohibited from coming into the United States, but the purpose of the Government of the United States is to show widest and heartiest courtesy towards all merchants, teachers, students and travellers who may come to the United States, as well as towards all Chinese officials or representatives in any capacity of the Chinese Government. All persons of these classes are allowed to come and go of their own free will and accord, and are to be given all the rights, privileges, immunities and exemptions accorded to citizens and subjects of the most favored nations."

The President has, according to the same source of information, issued special instructions through the Secretary of Commerce and Labor, that while laborers must be strictly excluded from American territory, the law must be enforced without harshness, and that all unnecessary inconvenience and annoyance towards those persons entitled to enter American territory must be scrupulously avoided. The officials of the immigration department have been told that no harshness in the administration of the law will for a moment be tolerated and that any discourtesy shown to Chinese persons by any official of the government will be cause for immediate dismissal from the service. The correspondent of *The South China Morning Post* says:

"The foregoing fairly summarized the official action of the government. Of course, this does not settle the matter of Chinese-American relations. Its early effect on the boycott, which is the most palpable thing at the moment, will be noted with interest, but for both countries the future holds much that will not be settled by an executive order. Deeper than this matter, and bound up with it, is the whole question of exclusion."

During the last month we have discussed the question of free admission of the coolie class into American territory with several prominent Chinese of Manila, and the consensus of opinion is that this is not desired or expected here in the Philippines. The leading Chinese of Manila say that to let the coolie into the Philippines without restriction would not only work a hardship on the natives, but on the Chinese as well. They cite the fact that in 1898 a large number of coolies was attracted to the Philippines in search of labor in connection with the military forces of the Americans, with disastrous results, financially, to the local Chinese.

Hundreds of coolies, attracted here by the prospect of employment, found that there was no work for them and went destitute, with the result that the local Chinese were compelled to feed and otherwise care for them while they were waiting for transportation home, and then pay the fares of all of them back to China. This condition they do not want repeated, although they do insist on a more liberal law for the exempted classes.

It seems to us that the American Government can not settle this exclusion trouble any too soon. America's trade interests with China demand prompt action, because the longer it is delayed that much longer will our interests be in recovering from the effects of the general boycott movement.

REVIEW.

"Railway Right-of-Way Surveying," by Albert I. Frye, S. B., M. Am. Soc. C. E.—The Engineering News Publishing Company, New York City. Cloth, 6x9 ins.; pp. 50; price $1 gold, plus postage.

This little book outlines a modern system of right-of-way surveying, leveling and mapping. Though the system as a whole applies particularly to railroads, the "adjustment diagram" feature will be found useful in the special adjustment of streets, canals, highways, and old boundary lines. The method of surveying herein described must not be confused with the common one of using the outside head of rail as a base line for locating the various structural features. Vast sums of money have been spent on such surveys, leaving no permanent field reference to lines run, and recording sets of maps without any measurements whatever. The simplest system, and that giving the most accurate, available, and permanent records, is one that reduces the important field measurements and office data to rectangular co-ordinates referred to an established center line. This is the system here presented. Address THE FAR EASTERN REVIEW.

"The Field Practice of Railway Location," by Willard Beahan, B. C. E.—The Engineering News Publishing Company, New York City. Cloth, 6x9 ins.; 260 pp.; 43 illustrations and 7 folding plates. Price $3 gold, plus postage.

The object of this book is to record the methods commonly used by American engineers in the western part of the United States in the location of railroads built since the Civil War. A most valuable study for a locating engineer. Address THE FAR EASTERN REVIEW.

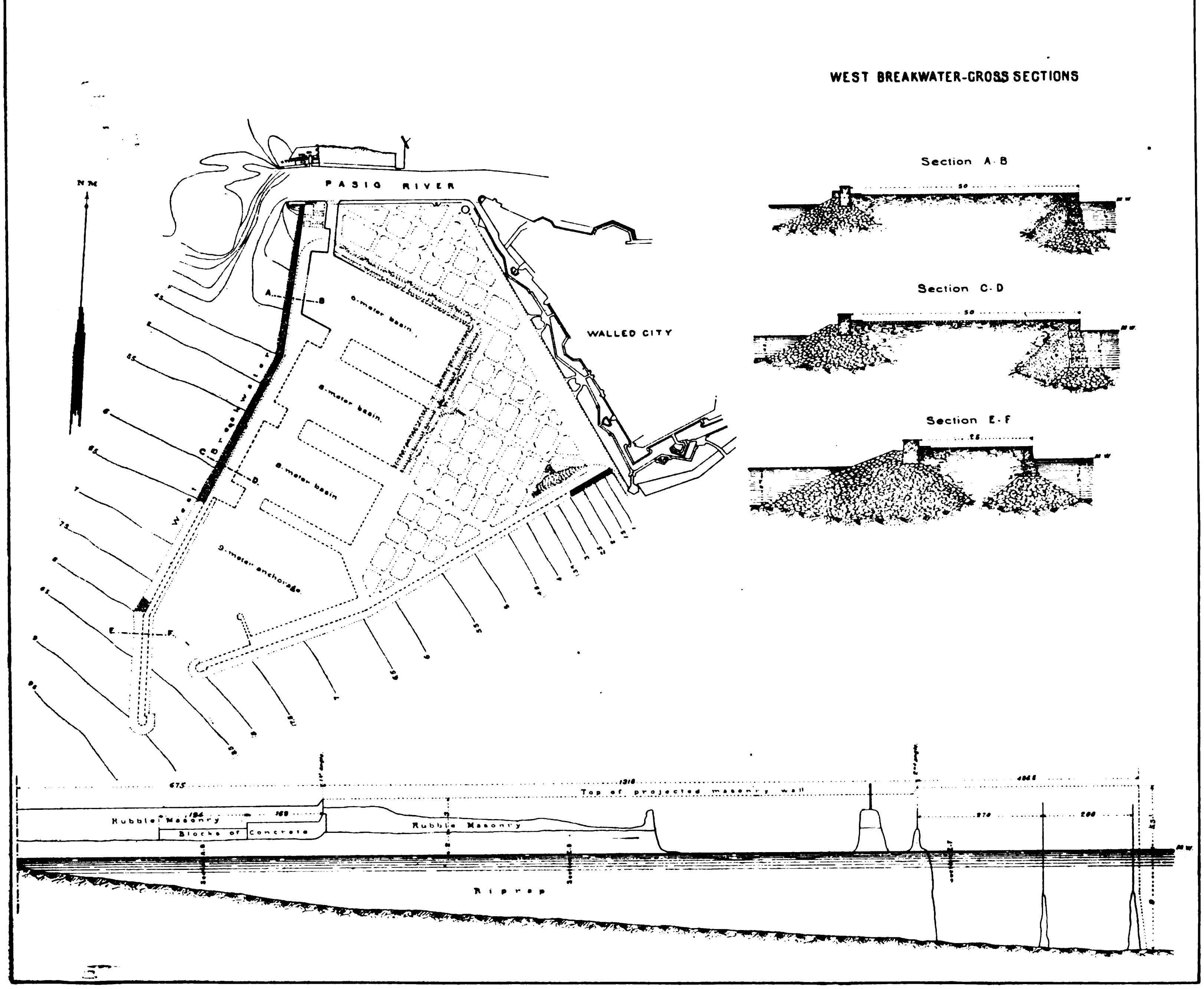
"Reinforced Concrete," by A. W. Buell and C. S. Hill; Part I., "Methods of Calculation;" Part II., "Representative Structures;" Part III., "Methods of Construction."—The Engineering News Publishing Company, New York City. Cloth, 6x9 ins.; 434 X. pp.; 311 illustrations and five folding plates. Price $5 gold, plus postage.

In preparing this book the authors have had in mind a treatise for designing and constructing engineers, following American practice, and governed by the conditions which prevail in America. In gathering materials for this book the authors have drawn freely upon the engineering journals of Europe and America, on the proceedings of technical societies, and on personal experience in designing and constructing works in reinforced concrete. Address THE FAR EASTERN REVIEW.

"Mechanical Appliances and Novelties of Construction," by Gardner D. Hiscox, M. E., being a supplementary volume to the author's work entitled "Mechanical Movements, Powers, and Devices."—The Norman W. Henley Publishing Company, New York City. Price $3 gold, plus postage; cloth; illustrated.

This is an encyclopedia of mechanical movements and mechanical appliances, including many novelties of construction used in the practical operation of the arts, manufactures, and in engineering, and intended for engineers, draughtsmen, inventors, patent attorneys, and all others interested in mechanical operations. Address THE FAR EASTERN REVIEW.

"Mechanical Movements, Powers, and Devices," by Gardner D. Hiscox, M.E., 10th Edition, Vol. I Cloth; 400 pp; 1,800 illustrations. Price $3 gold, plus postage.—The Norman W. Henley Publishing Company, New York City.



MANILA PORT WORKS.—GENERAL PLAN OF HARBOR ACCORDING TO SPANISH PROJECT OF 1892 SHOWING WEST BREAKWATER EXTERIOR, AND WORK COMPLETED TO JUNE 1896

STEEL PIER CONSTRUCTION, MANILA PORT WORKS

(Continued from page 57.)

be able to tie up at the piers with safety if she comes into port with not more than a 29-ft. draught. In this connection it is interesting to note that the tides are not at all even in Manila Harbor, a disadvantage not experienced in other ports of the Orient; nor does it generally reach the height attained at other places. The mean tide here the year round is about $2\frac{1}{2}$ ft. It is estimated, however, that with a uniformly deep harbor, and the proposed pier facilities, immense benefit will accrue to shipping. The present expensive system of lighterage will be done away with and demurrage reduced to the minimum.

CHANGE IN PORT WORKS SUPERVISION.—The plans for the new piers have been prepared with great thoroughness and careful regard for detail by Mr. H. C. DeLano, C. E., assistant engineer in charge of the deep-water harbor, under the direction of Major C. McD. Townsend, Corps of Engineers, U. S. Army, who, after a long and efficient tour of duty in the Philippine Islands, has just relinquished his office to Major Walter L. Fisk, Corps of Engineers, U. S. Army, who recently arrived in Manila from America. Major Townsend's engineering work in the Philippines has been of the highest order, and it is with much regret on the part of the government that it is compelled to lose his services, particularly at this time, when large works which he has started are just beginning to materialize. Major Townsend is not only a thorough engineer but a delightful and courteous gentleman as well. He is considerate of those about him and painstaking in every detail pertaining to his high profession. Major Townsend has depended largely upon the efficient services of Mr. DeLano in the administration of his office, and at all times since their association there has been a perfect understanding between them of the work under way. This has not only rendered their respective duties pleasant, but has kept them in perfect accord, one with the other, a condition in engineering undertakings of great magnitude which makes for successful accomplishment.

THE STEEL PIERS.—The two steel piers about to be constructed are the undertaking of the insular authorities, for which the Philippine Government recently set aside an appropriation of -P-1,100,000 Philippine currency, or $550,000 gold. One pier will be 650 ft. long by 110 ft. wide, and the other 600 ft. long by 70 ft. wide, and they will be located as shown in accompanying drawings. In addition to these structures, the Quartermaster's Department of the army will also be provided with a pier, 500 ft. long by 60 ft. wide, its location also being shown in the drawings. The contract for this pier has been let to Messrs. J. G. White & Company, Inc., who are about to begin the construction. It will be of wood, with piles protected against the toredo by the perfection process.

STEEL AND CONCRETE SUBSTRUCTURE.—Both piers of the insular government are to be of the same design, the only difference being in dimensions. They will be supported by a series of pile clusters inclosed in a thin steel shell, which will be filled with concrete. The result aimed at is that when the steel shell becomes corroded and falls apart the concrete will have developed sufficient strength to bear all the strain put upon it. The steel casing is estimated probably to last longer than five years and by that time the concrete will have attained all the strength expected of it. In the case of $\frac{1}{3}$ of the piles each cylinder will be driven to a grade of 10 ft. above bottom, $\frac{1}{3}$ to a grade of 15 ft. above bottom, and the remaining $\frac{1}{3}$ to a grade of 20 ft. above bottom.

After the cylinders have been driven in position and the mud pumped out of them the concrete will be spouted to a level with the tops of the highest piles, the water pumped out of the cylinders and a steel reinforcement set in position. Then the remainder of the concrete will be put in. The concrete deposited under water will be of the proportions 1, 2, 4, and that in the reinforced portion of the cylinders will be of the proportions 1, 2½, 5, with the exception of the last 2 ft., which will be capped with concrete of the proportions 1, 1, 2.

Braces and Deck Support.—These cylinders are to be spaced in bents 25 ft. apart, with a 20-ft. interval between cylinders and capped with 37¼-in. plate girders, which are to be fastened to each cylinder with two 1¼ 24-in. bolts let into the concrete of the cylinders. The first bent of cylinders is to be an exception to the above rule, in that it will be spaced 45 ft. out from the bulkhead, and capped with 46¼-in. plate girders bolted to the cylinders as heretofore described. The first bent will be connected to the shore abutment with 46¼-in. plate girders spaced 10 ft. apart, and bolted to the shore abutments in the manner above described, and connected to the first bent cross-caps. At right angles with and connected to the large first bent rangers there will be 10-in. 25-lb I-beams, spaced 5 ft. apart, to support the deck. The 25-ft. spaces will be spanned by 24-in. 80-lb I-beams, spaced 5 ft. apart and connected to the cross-caps. Along the sides of the piers there will be placed box girders connected with the cross-caps and constructed of two 18-in. 55-lb I-beams with ½ 20-in. cover plates. The object of the box girder is to give resistance against impact of small vessels with the piers.

The outer corners of each pier will be constructed of 18-in. 55-lb I-beams bent to a quarter circle of about 15 ft. radius so as to connect with the adjacent box girder and each header, as shown in an accompanying drawing. The quarter circle corners will be supported and braced by 18-in. 55-lb I-beams, extending radially from the middle and the ends to the centrally located 8-pile cylinder, upon which they bear, by 1⅛-in. bolts. There will be a system of intermediate bracing composed of 10-in. 25-lb I-beams with tie rods 1⅛-in. in diameter connected with the quarter circle and radial beams as shown in the drawing. These rounded corners are designed to greatly facilitate the berthing of vessels.

The decking will be constructed of slabs of concrete in the proportions 1, 2½, 5, with steel reinforcement of expanded metal. This is designed to sustain a floor weight of 400 lbs. per sq. ft.

Block Pavement and Asphalt over Decking.—Over the concrete decking will be placed a wooden block pavement set in asphalt. Provision will be made in the substructure of the larger pier for a 50-ton crane with which it is proposed to equip it. This crane will enable manufacturers shipping heavy machinery to the Philippines, or from Manila, to have safe and speedy landing or loading at a reasonable cost.

Along the sides and ends of the piers a row of fender piles will be placed, as shown in the drawings, connected and braced together by a walling composed of three 6x12-in. creosoted Oregon pine timbers let into the piles 2 in. and bolted to each by 1¼-in. bolts. Between the piles will be placed chocks of 10x12-in. creosoted Oregon pine timbers, which will be fastened to the walling by ¾-in. bolts. The fender piles will be fitted with car-spring buffers placed between each pile and the pier structure, to reduce the shock of impact from the vessels.

There will be two large cast-iron mooring posts, of the form and dimensions shown in the drawings, on the large cylinders at the outer corners, and two on the shore abutments of each pier, which will also be furnished with four small cast-iron mooring posts placed and fastened as shown in the drawings. In addition to the above moorings, cast-iron cleats will be placed along the fender walling at 50-ft. intervals.

For the purpose of determining the number of piles to be required in each cylinder a test pile has been driven and loaded to 65 tons without appreciable sinkage. Borings will be taken alongside of this pile and in the areas over which it is proposed to construct the piers, and from data thus obtained the safe loading value of the piles will be determined.

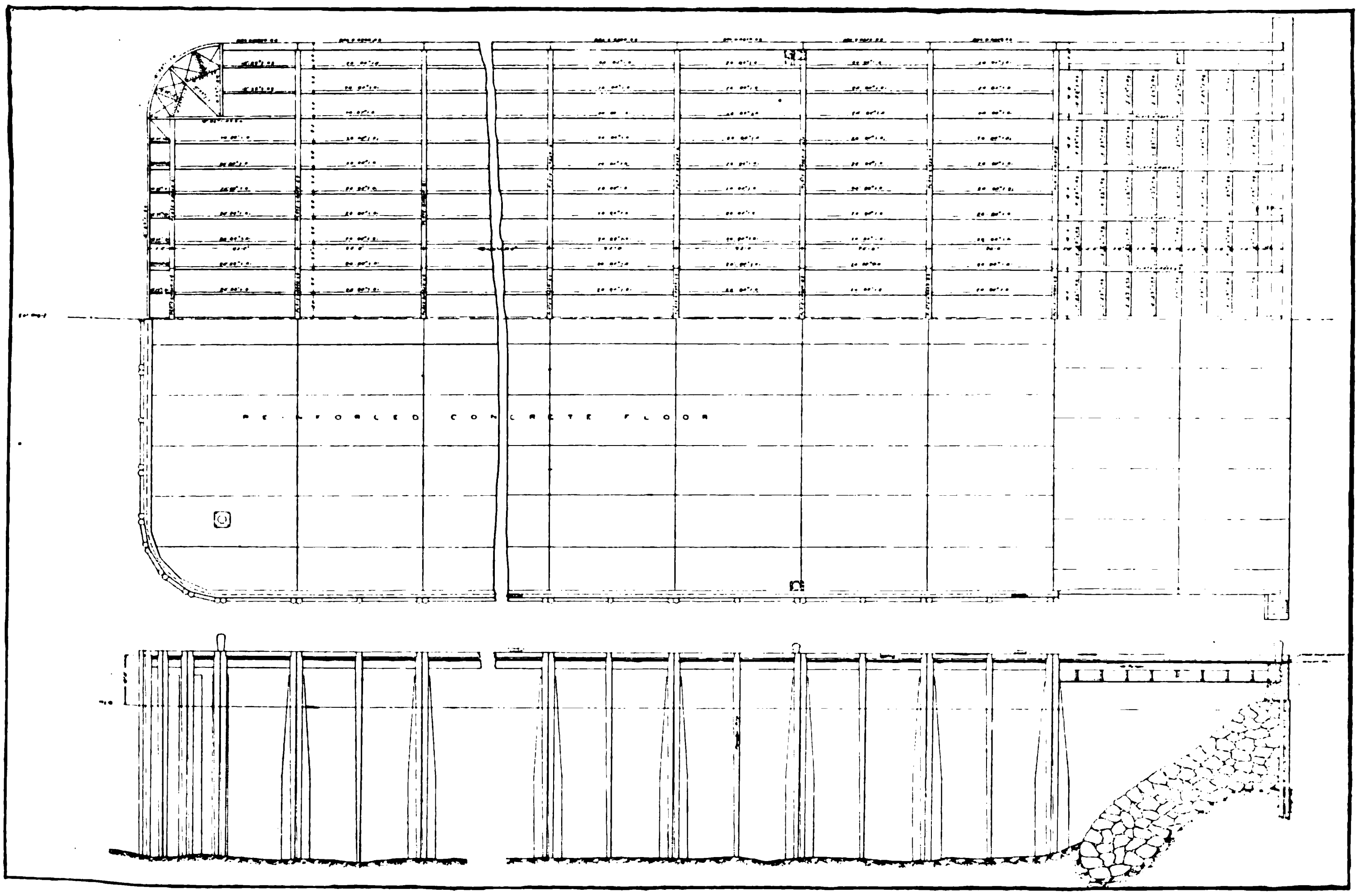
IMPROVEMENT OF PORT AND RIVER

Major Townsend's report on the operations of his office during the fiscal year ended June 30th, 1905, has just been submitted to the Governor-General of the Philippine Islands, through Commissioner W. Cameron Forbes, Secretary of Commerce and Police.

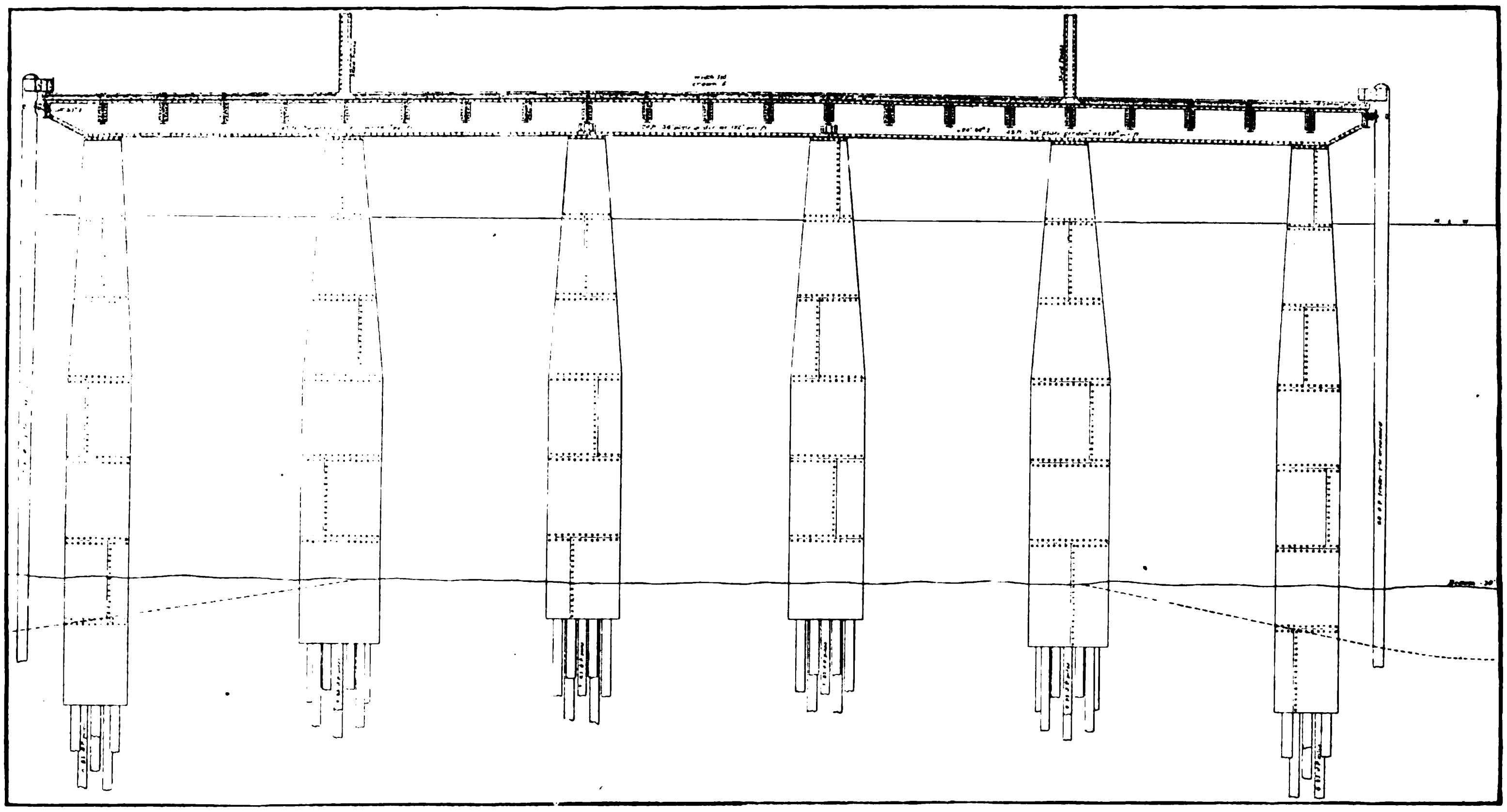
According to this report the total appropriation for the improvement of the Port of Manila and Pasig River, made by the Philippine Commission, since October 15th, 1900, amounts to $4,398,000 United States currency. Before describing the existing project Major Townsend deems it advisable to give a brief summary of the work done previous to American occupation. In this connection he says:

The improvement of the Port of Manila was begun in 1755. At that date the Pasig River emptied into Manila Bay at Fort Santiago, and what was called the Port of Manila consisted of the portion of the river between its mouth and the site of the present Bridge of Spain. A bar obstructed the entrance to the river which limited navigation to light bancas.

In that year were constructed two wooden jetties extending into the bay which caused the bar to recede, but also produced a large accretion to the shore of Manila Bay, especially N. of the river, so that it became necessary to lengthen them from time to time. Stone quays were also built along the river banks, but of weak section and having little depth along their fronts. There is also reported the construction of a basin on the right bank of the river, having a depth of 5 meters below mean tide. In 1833 a dredge was purchased



MANILA PORT WORKS.—PLAN AND ELEVATION OF STEEL PIERS ABOUT TO BE CONSTRUCTED FOR THE PHILIPPINE CIVIL GOVERNMENT



MANILA PORT WORKS.—DESIGN OF PIERS WITH CONCRETE CYLINDER FOUNDATIONS AND CONCRETE DECK

by the government and a narrow channel of 12 ft. depth was maintained across the bar by dredging annually about 100,000 cubic meters of material.

Numerous projects have been instituted for the improvement of the port, but the first suggestion of the present outer harbor appears to have been made by Spanish military engineers who proposed to construct a breakwater in the bay, on which a fort could be located to protect the city in time of war and afford a refuge for the fleet. It is noted that this work will also be beneficial to the shipping interests of the city.

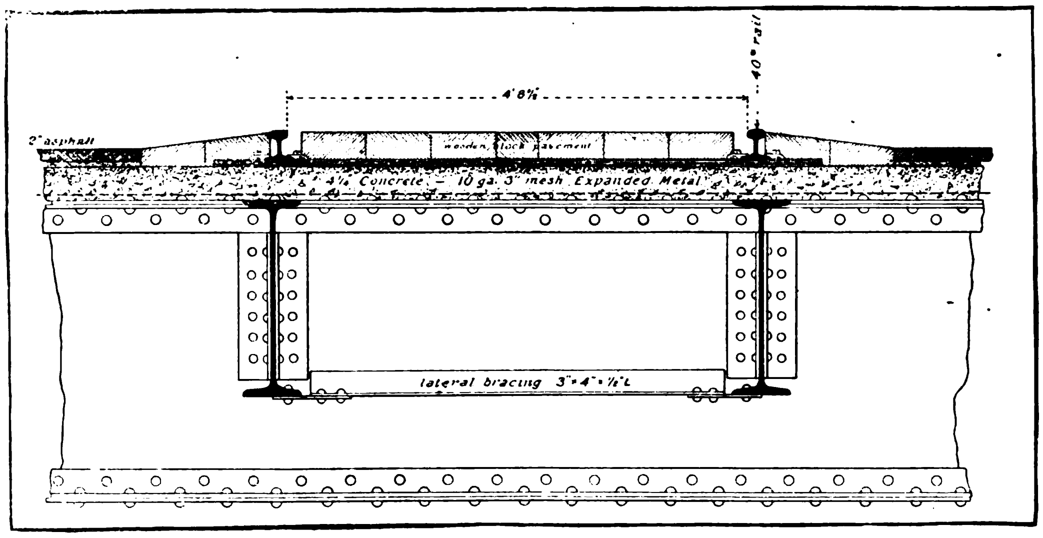
In 1667 there was established in the Philippine Islands a bureau of public works, to which was assigned among its other duties that of studying the improvement of the port of Manila. A preliminary project was submitted in 1876 by Sr D. Eduardo Lopez Navarro, which received the approval of the Spanish Government in 1879, with certain modifications, which were referred back and forth between the home government and the colonial authorities until March 16th, 1892, when the project was finally approved. This project deals with the improvement of the outer harbor, of the Pasig River, and of the esteros of the city. The project for the outer harbor is shown in an accompanying drawing. The works projected had for their object the construction of (1st) an ante port 9 meters deep, (2d) two basins 9 meters deep each containing 180,000 square meters for large sea going vessels, (3d) a basin 6 meters deep with an area of 215,000 square meters for vessels of the coasting trade, (4th) a canal of communication between this last basin and the Pasig River 5 meters deep, and 20 meters wide for the first 100 meters, over which it was proposed to construct a draw bridge, and 5 meters wide in the other 125 meters, (5th) an earth fill surrounding the basins on which warehouses were to be erected. A ship yard for repairing all classes of vessels is also mentioned in the project, but not shown on the plans.

To accomplish those objects it was proposed to build: (a) a west breakeater beginning near the southern mole at the mouth of the Pasig River and extending S. 6° W. for a distance of 676 meters, thence S. 26° W. 1310 meters, thence due S. 486.5 meters; (b). an E. breakwater starting near the present monument to Legaspi, and extending SW. ¼ W 1280 meters and-hence WSW 771.5 meters; (c) walls inclosing the various basins and canal; (d) to dredge the basins and canal to the depth proposed, and (e) to fill the space between the break water, basin walls and the Plaza Santa Lucia with the material thus obtained.

The breakwaters were to be constructed with a base of rip rap to mean tide and a rubble masonry superstructure. The rip-rap substructure was to be given an interior slope of 4 vertical to 5 horizontal, estimated as the natural slope the rock would take on being deposited. The exterior slope was to be 1 on 2 for the first alignment of the W. breakwater, from 1 on 2 to 1 on 3 for the second alignment, and from 1 on 3 to 1 on 3½ for the third; in the E. breakwater, 1 on 2 for the first alignment, and from 1 on 2 to 1 on 2½ for the second.

The masonry superstructure also varied in the various portions of the breakwater, having a height of 4.37 meters and top width of 1.5 meters in the first alignment of the W. breakwater, a height of 5 meters and top width of 2.5 meters in the second, and a height of 5.5 meters and width of 3 meters in the third. The interior face of the parapet was to be vertical, the exterior face was to have a slope such as would increase the width of base 5/10 of a meter. This wall was to be surmounted by a coping of cut stone 0.37 of a meter in height on the first alignment and 0.8 of a meter on the second and third. As a further protection against wave action large concrete blocks were laid against the exterior slope of the parapet of the first alignment and heavy rip-rap proposed for the other two alignments extending to a height of 2 meters above mean time. The dike was to end in a mole 33 meters in diameter of concrete and rubble masonry founded on a rip-rap base, 3.5 meters below mean tide at its further extremity, but to be protected from wave action by concrete blocks if in the judgment of the engineer in charge such protection was necessary.

The E. breakwater was to be similarly constructed. The walls of the basins were to have a foundation of rip-rap with a monolithic base of concrete in sacks, on which were to be deposited concrete blocks to mean tide, and



MANILA PORT WORKS.—TRACK AND FLOOR DETAILS OF THE NEW PIERS

above this elevation rubble masonry with a cut stone coping. The top of the rip-rap foundation was to be on a level with the bottom of the various basins. The height of the walls varied from about 1 meter above mean tide in the canal to 3 meters in the ante port. These walls were also to be backed by a pile of rip-rap.

The estimated cost of the outer harbor was five million (5,000,000) pesos.

The project also contemplated maintaining a channel in the Pasig River and across its bar by dredging; the reconstruction of the quay walls along the river banks, and an improvement of the upper Pasig considered as an accessory to the harbor improvement as it afforded the most feasible method of transporting the rock required in the works.

A general improvement of the esteros within the City limits by dredging and construction of quay walls was also proposed.

Upon the approval of the provisional project, there was created by decree of January 2d, 1880, the Junta of the Port of Manila, to generally supervise the work of improving the harbor and to administer the funds set aside for the purpose. Those funds were principally derived from a duty on imports and exports and a tonnage tax on vessels entering the port. These taxes originally were 2% on imports, 1% on exports, 20 centavos a ton on vessels navigating the high seas, and 10 centavos a ton on those engaged in the coasting trade, but were modified subsequently by various decrees, and other funds were set aside for works assigned to the junta, such as the construction of light-houses, and the building of the Ayuntamiento.

The funds collected from 1880 to 1898 for these purposes were 11,155,873.70 pesos, of which 6,651,444.76 pesos were available for the works of the port. The expenditures of the junta for the same period were 8,740,643.73 pesos, of which 6,707,219.76 were expended on the works of the port. Of this amount 3,566,406.63 pesos were expended on the outer harbor, 1,828,600.64 pesos on the Pasig River, and 653,736.15 pesos on the esteros. The balance 638,477.33 pesos represents concrete blocks constructed but not placed on the work, property at the various quarries, and the machinery and buildings belonging to the Works of the Port at the close of operations. This material greatly deteriorated during the suspension of operations.

The discrepancy between receipts and expenditures appears to arise from the use of certain of the funds for military purposes during the insurrection of 1896.

At the close of the Spanish régime, the first alignment of the W. breakwater had been constructed. Of the remainder of the breakwater 600 ft. had been completed except the coping, 2000 ft. to within about 2 ft. of the top of the rubble masonry wall; for 1700 ft. the rip-rap foundation was in place, and portions of the rubble masonry wall built; for 1500 ft. the rip-rap foundation had been begun. 600 ft. of the E. breakwater bad been completed. The walls of the canal had been built; also 2420 ft. of the walls of the 6 meter basin, with the exception of 200 ft. on the W. side which were only partially completed. About 542,000 cub. yds. of rock had been placed of the 1,275,000 cub. yds. estimated to complete the project.

Practically none of the dredging had been done, and of the fill, only a small area on Engineer Island and along the Pasig River with material dredged from the river.

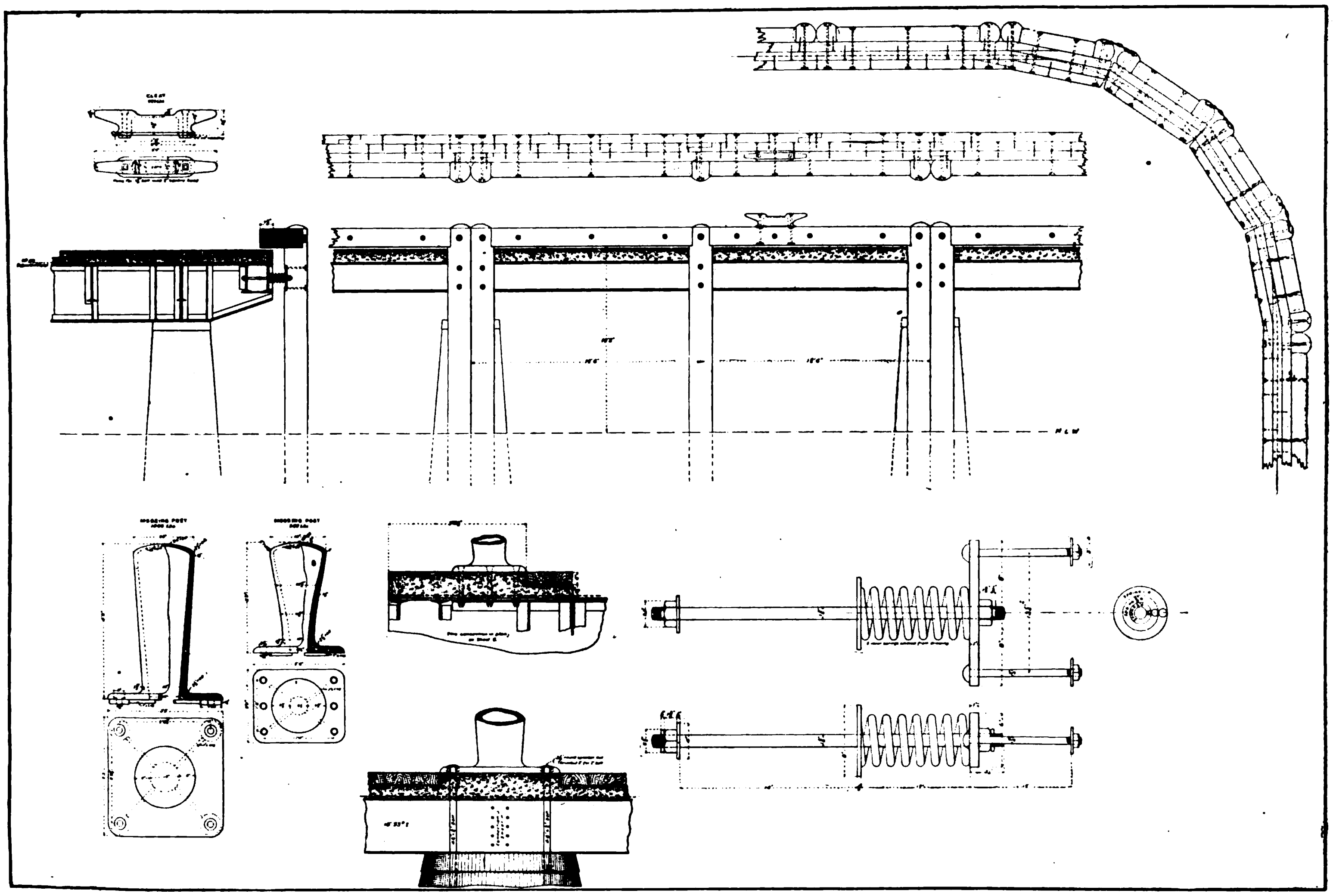
THE AMERICAN PROJECT.—With American occupation the project was again revised. It was evident that the cost of the work would largely exceed the estimates, and that under the Spanish project a long period of time must elapse before the work could be utilized for any purposes, as the breakwaters must first be built to protect the basin walls from wave action during storms and a large part of the latter afterwards constructed before dredging could be begun.

The first great necessity of the harbor was protection to shipping from typhoons and the SW. monsoon which rendered the loading and unloading of vessels in the open bay difficult during many months of the year. To afford this relief as early as practicable, it was decided to complete the W. breakwater, and dredge the area partially protected by it. The cheapest way of disposing of the material was to erect a temporary bulkhead parallel to the shore line behind which it could be pumped. This space in the Spanish project was to form portions of the various basins.

The system of enclosed basins while desirable in European ports where there is a large tidal range, is not as suitable for Manila Bay where the tides are moderate. By constructing locks at the outlets to the basins and basing their depth on high tide, there is in the former ports a large saving in excavation, and the height required for the quay walls is reduced. The basins afford quiet water for loading and unloading vessels but are difficult for large steamships to enter. They also do not admit of a ready expansion of dock frontage to keep pace with the growth of commerce.

In American ports for the basins are very generally substituted wharves extending at right angles to the shore, protected where necessary by an exterior breakwater. These wharves constructed usually of wood or iron are much cheaper than the stone quay walls of the basins. For the same frontage they afford a much greater space at which vessels can be moored. This system gives a greater protected area than the enclosed breakwaters of the Spanish project, but not as quiet a harbor. The wharves can readily be multiplied and extended as the demands of commerce increase.

For these reasons it was decided to further modify the project. (The existing project is shown in plan on an accompanying map). Under this project, the W. breakwater is extended 492 ft. to the 30 ft. contour. A detached breakwater extends for a distance of 3,000 ft. approximately parallel to the shore line, with



MANILA PORT WORKS.—FENDER PILE AND MOORING DETAILS OF THE PIERS.

an entrance 710 ft. wide at mean low water. The walls constructed under the Spanish project have been utilized to form a small inner basin, 19 ft. deep at mean low water, from which a bulkhead extends approximately parallel to the shore line and about 1900 ft. from it to the line of the Spanish E. breakwater. Beyond this bulkhead an area of 330 acres is to be dredged to 30-ft. depth at mean low water, and the dredged material deposited behind it.

The general form of the W. breakwater as adopted in the Spanish project is retained, but the height reduced to 11 ft. above mean low water.

The detached breakwater is given an exterior slope of 4 on 5 (assumed as the natural slope of rip-rap) to a height of 12 ft. below mean low water, and 1 on 2 above this elevation. The interior slope is the natural slope of the rip-rap to low water, thence a slope of 1 on 10. The elevation of the top of the breakwater is 8 ft. above mean low water and the top width 10 ft. Below low water the stone was to be deposited as rip-rap. Above low water, it was to be laid to the slopes designated.

The specifications require that all stone deposited in the substructure shall exceed 100 lbs. in weight; two-thirds the mass must consist of stone weighing at least 1000 lbs. and not least than ⅓ by weight of each load deposited must consist of stone weighing at least 4000 lbs. (which were to be placed on the sea slope). In the superstructure no stone used shall weigh less than 1000 lbs. except those employed for clinking the larger stone, and at least ½ the total weight of each load deposited must be of stone weighing not less than 4000 lbs. The top of the wall was to be composed of stone weighing no less than 2000 lbs.

The stone supplied by the contractors largely exceeded these requirements, over 80 per cent of the weight of the mass delivered consisted of stone exceeding 2 tons in weight. Seventy-five ft. of the breakwaters was constructed of the form shown in accompanying drawing. This form affords a better bond for the superstructure than the one specified. The contractors, however, found difficulty in quarrying rock of the regular sections required.

The bulkhead as originally designed was intended as a temporary structure, to be ultimately replaced by a masonry wall. It consisted of a double row of sheet piling supported by a row of 12-in squared piles, 4 ft. between centers, to which it was connected by 6x12-in walling and tied back to a second row of piling 8 ft. between centers. It was to be reenforced by selected dredged material deposited behind it, but as the work progressed it was found that the structure had not sufficient strength to resist wave action nor the pressure of the mud dredged. It was then reenforced by a rip-rap wall, laid to a slope of 1 on 2 in the shallow water in which it was constructed. This provided protection against typhoons until the detached breakwater could be constructed and gave a sufficient supply of stone to rip-rap the front of the bulkhead to the slope the stone will assume, when the dredging is completed.

This bulkhead is a cheaper structure than the retaining walls of the Spanish project. These walls were designed to support a thrust of sand, and were of too weak a section to resist a mud fill. It has become necessary to reenforce the walls constructed in the inner basin with rip-rap to prevent their being overturned. As the canal is too narrow to permit of such a construction, the mud thrust was taken off the wall by building a water-tight bulkhead behind it, and filling the space between the bulkhead and the wall with river sand.

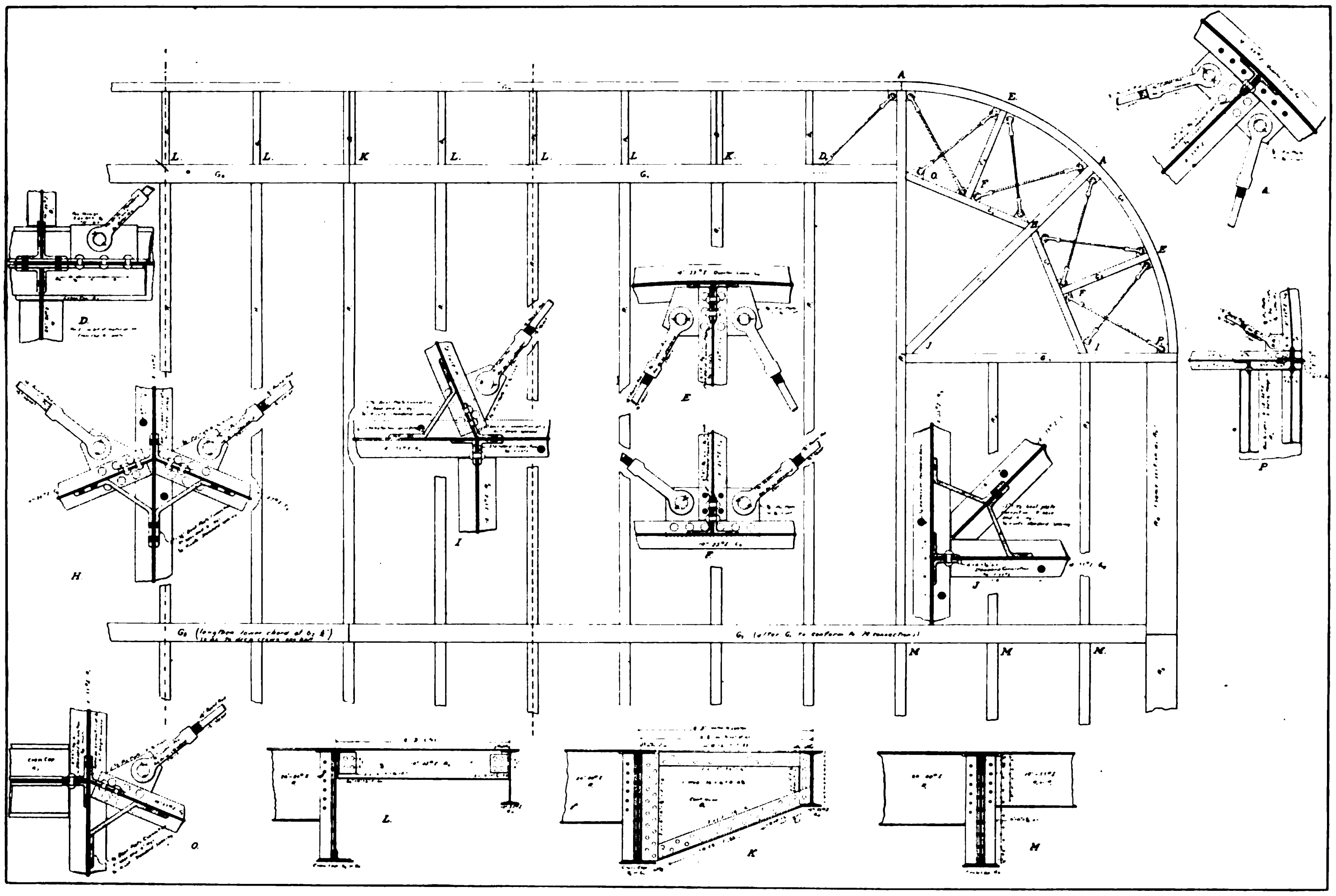
The height of the fill was originally placed at 7.5 ft. above mean low water, but to allow for settlement and also to afford space for additional dredged material, the height was increased to 10.5 ft. The area of land between the Malecon Drive and the bulkhead is 191.4 acres of which about 148 acres were filled to the height indicated. The remainder of the area was occupied by the Quartermaster's Department, U. S. Army, and it was necessary to construct a water-tight coffer-dam to keep the dredged material from overflowing their territory.

The work has been done by the Atlantic, Gulf and Pacific Company under contracts and supplemental agreements dated August 12th, 1901, September 30th, 1901, January 19th, 1903, July 3rd, 1903, and January 31st, 1905.

At the close of the last fiscal year the contractors had completed the bulkhead and protected it with 208,211 tons of rip-rap. The E. breakwater had been extended to the bulkhead line; 3,384,102 cu. yds. of material had been dredged from the harbor and deposited behind the bulkhead; 233,712 long tons of rock had been placed in the W. breakwater, and 106,700 tons in the detached breakwater; 5,373.68 cub. yds. of rubble masonry of the superstructure of the W. breakwater had also been constructed. The stone walls of the inner basin had been reenforced with rip-rap, and a coffer-dam 2433 ft. in length constructed to protect the Quartermaster's Department's buildings from overflow by the dredged material.

During the present fiscal year 24,571 long tons of rock have been deposited in the substructure of the W. breakwater; 4,838.46 cub. yds. of rubble masonry and 4,058.17 cub. yds. of concrete coping laid in its superstructure, completing the W. breakwater with the exception of the concrete foundation for a light-house proposed for its outer end. In the detached breakwater 342,575 tons of rock

(Continued on page 72.)



MANILA PORT WORKS.—END DETAILS OF NEW PIERS.

TRADE REPORT AND RETURNS OF TIENTSIN, 1904

GREAT INTERNATIONAL BRIDGE AT TIENTSIN, NORTH CHINA

The Tientsin (North China) Trade Report and Returns, compiled and issued recently by order of the Inspector-General of Customs, contains much valuable information of a general character concerning the industrial and commercial development of North China, as well as a fund of absorbing facts about Tientsin and contiguous territory. By way of introduction the report says that on reviewing the trade of Tientsin during the period covered, the general conclusion must, on the whole, be a favorable one. Whatever the future may have in store for this port—the future with its totally revolutionized inland communications, keen competition, and severe tests upon natural shipping facilities—the present Tientsin trade is still a vigorous and a growing one.

MATERIAL PROGRESS OF THE PORT.—Under the liberal and confidence-inspiring policy of Viceroy Yuan, seconded by a body of exceptionally able officials, Tientsin has been allowed full scope for advance and development. In the Native City, during 1904, several large improvements were started. A tramway will ere long traverse the length of the Chinese Bund. The mains of the Native City waterworks are being extended throughout the city and its suburbs. A new iron bridge is being constructed over the Grand Canal near the Haikwan Tao's yamen. The Native City railway station, about 1½ miles to the North-east of the Viceroy's yamen, has not yet succeeded in drawing as much traffic as was expected, but progress in that direction is also noticeable, and the ground along the splendid road leading to this station is gradually being built upon.

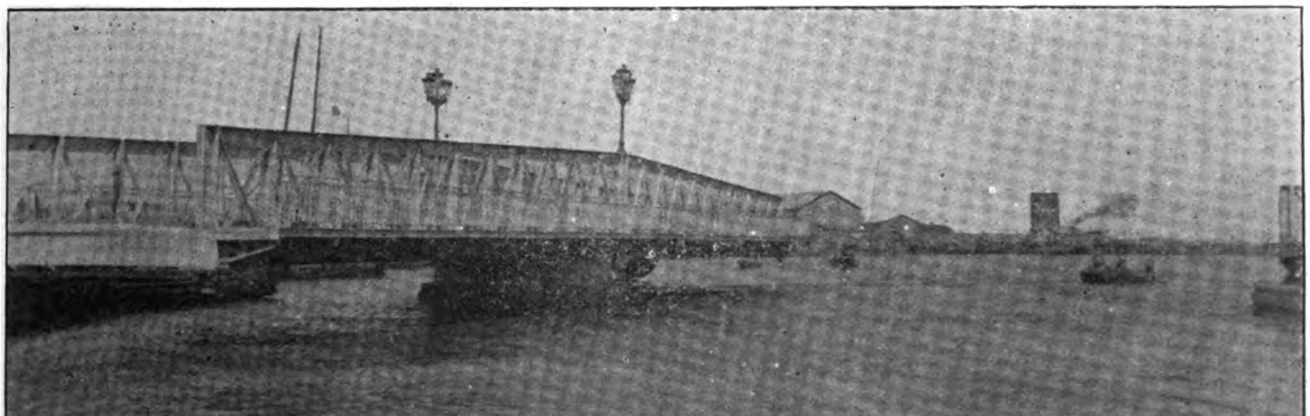
As regards the Settlements, and greatest activity has probably been shown by the Japanese. The German Concession is progressing steadily, and promises to become an attractive residential portion of the port. The British "Extra Concession" has thrown out a few more fringes of houses, while the heart of the old British Town has been enriched during the year by some magnificent mansions for housing the staff of one of its great hongs, a large up-to-date office building, etc. The establishment of the Netherlands Consulate has also brought the number of "full" consulates up to that at Shanghai.

An enterprise of some magnitude was the starting during the year of a lighter service under the management of Messrs. Butterfield & Swire, consisting of seventeen lighters and four powerful tugs, built in Europe and sent out in sections, which were fitted together in Shanghai and then sent oversea to Tientsin. In connection with this enterprise, docks and repair shops were erected at Tangku, which also undertake outside work. Another addition at Tangku has been the building of three oil tanks, of 500,000, 500,000 and 1,000,000 gallons capacity, respectively, by Messrs. Arnhold, Karberg & Co.

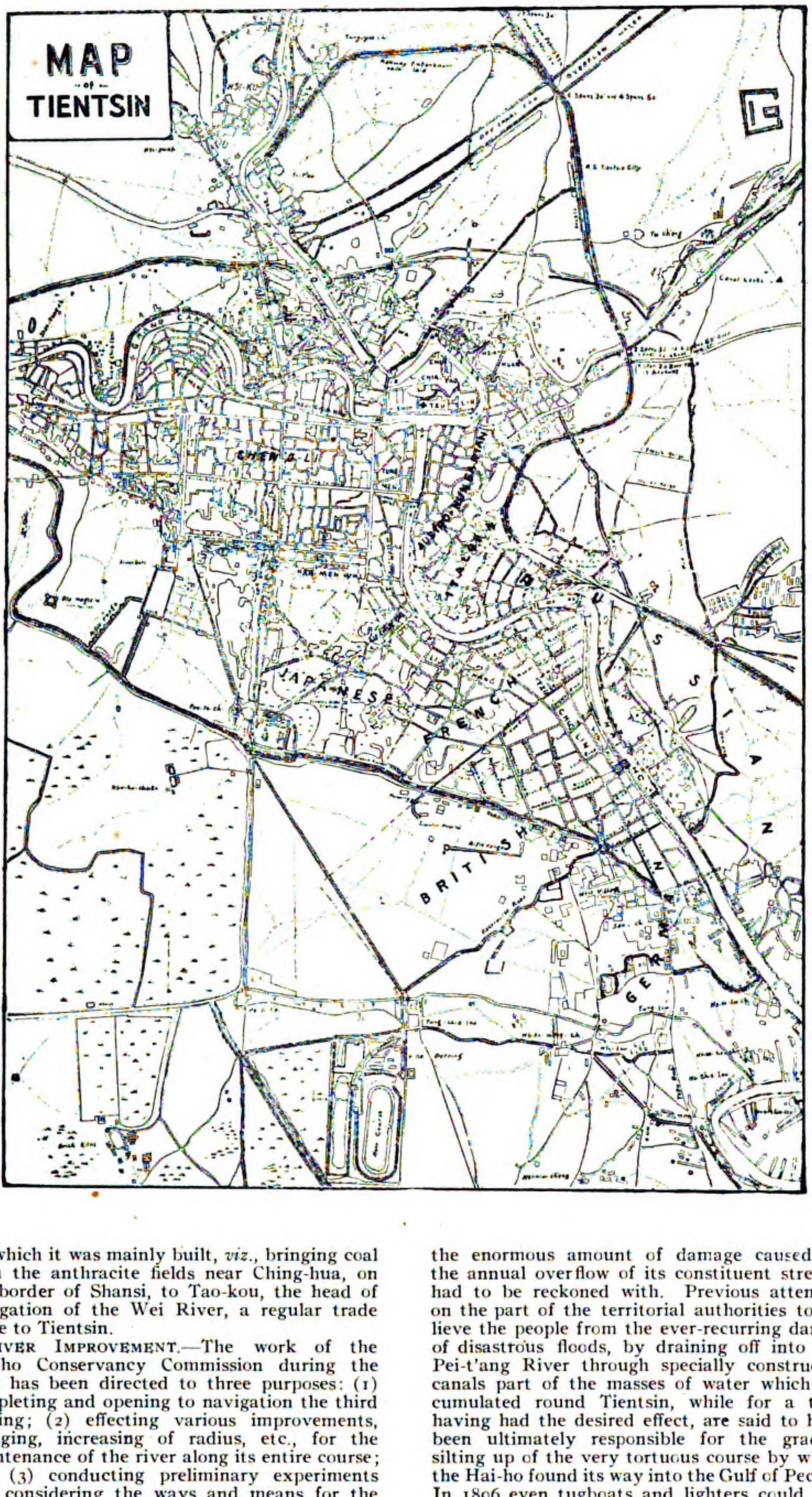
RAILWAYS.—The Peking-Tientsin-Newchwang Railway (Imperial Railways of North China), has taken another great stride forward in traffic and earnings during the past year. The most noticeable advance has been over the portion outside the wall, through the opening of the branch Koupangtzu-Hsinmint'un and the great rush of traffic drawn in that direction by the war operations around Mukden. With an annual expenditure of some $2,500,000, the entire line took in almost $6,000,000, thus showing net earnings during the year to the amount of $3,500,000. The main source of income inside the wall was on goods traffic, which yielded somewhat more than passengers (say, $1,500,000 each), after which comes coal, with almost $600,000. Outside the wall the gross receipts amounted to $1,800,000, as against $900,000 during 1903. The passenger traffic showed substantial improvement, as well as the freight service under almost every head. Substantial additions to the rolling stock for freight are contemplated. The rates remain mostly the same, viz., ½ cent per picul per mile for first-class merchandise to ¼ cent for third-class (coal, bricks, etc.). Calculated according to car capacity per ton, these rates are from 5 to 1¾ cents per mile. The passenger rates are 6, 3½ and 2 cents per mile for the three classes.

The great Pei-Han trunk line is on the eve of completion. There only remains the Yellow River bridge to be finished, it is hoped, in August, 1905, and the constructional service on the stretches adjoining the Yellow River to be converted into regular traffic. The total distance, Peking-Hankow, is 754 miles, of which 342 lie South and 412 North of the Yellow River. The entire distance is laid for single track, excepting some of the more permanent bridges. The Yellow River bridge is on single width, but its mode of construction allows of a widening when necessary without repeating initial operations. It is proposed at first to divide the journey into three day stages: Peking-Shuntêfu-Chêngchou-Hankow. Afterwards it is expected to do the journey in 36 hours, with sleeping cars. The northern portion of the line is laid over flat country, but to the South of the Yellow River it skirts some low hills, with their peculiar troglodyte population, and crosses over picturesque ranges, which form the watershed between the Yangtze Basin and Huai River system near Hsin-yang-chou. The passenger tariff per mile is to be based upon 5.8, 3.9, and 1.9 cents for the three classes respectively. The Yellow River bridge has a length between land piers of 3,278 yards. It is composed of 120 spans, of which 50 show 34.12 yards daylight between piers and the remainder 22.90 yards. Each pier is composed of four to six screw piles (1 foot diameter, embedded about 50 feet in the sandy soil), which are braced together and protected by four more piles at the corners. The rails are carried some 16½ feet above high-water level, between the main girders over the longer, and on top of the girders over the shorter, spans. At the end of 1904 about half the number of piers were built Some trouble was experienced with ice, which damaged much of the structural work during the past winter.

The Chêngting-Taiyuan narrow gauge line is being actively proceeded with, and will soon become a *fait accompli*, much to the credit of the French energy, financing, and engineering enterprise which called it into being. The Tientsin-Chinkiang project, however, is still in the state of chronic deadlock which overtook it a few years ago. The Pekin Syndicate railway, a short slanting line apparently running from nowhere, bisecting and bisected by the Pei-Han line, has in reality started on the work



INTERNATIONAL BRIDGE WITH DRAW OPEN



for which it was mainly built, *viz.*, bringing coal from the anthracite fields near Ching-hua, on the border of Shansi, to Tao-kou, the head of navigation of the Wei River, a regular trade route to Tientsin.

River Improvement.—The work of the Hai-ho Conservancy Commission during the year has been directed to three purposes: (1) completing and opening to navigation the third cutting; (2) effecting various improvements, dredging, increasing of radius, etc., for the maintenance of the river along its entire course; and (3) conducting preliminary experiments and considering the ways and means for the great bar improvement scheme.

In addition to being icebound for three months out of twelve, the port of Tientsin has for years past labored under the disadvantage of not being able to maintain in a navigable condition its channel of communication with the sea—made up of the waters of the Pei-ho, the Hsi-ho, the Tach'ing-ho, and the Grand Canal, whose point of confluence is a little above the native city, and whose united volume is thereafter known as the Hai-ho. The question of dealing, on scientific lines, with the improvement of this waterway, is a very old one, because, apart from the interests of trade, the enormous amount of damage caused by the annual overflow of its constituent streams had to be reckoned with. Previous attempts on the part of the territorial authorities to relieve the people from the ever-recurring danger of disastrous floods, by draining off into the Pei-t'ang River through specially constructed canals part of the masses of water which accumulated round Tientsin, while for a time having had the desired effect, are said to have been ultimately responsible for the gradual silting up of the very tortuous course by which the Hai-ho found its way into the Gulf of Pechili. In 1896 even tugboats and lighters could not come up to the British Bund. It was then felt by all concerned that futile discussion must be abandoned in favor of practical remedial measures, and funds were raised for the construction of locks in the canals. The cost of these was estimated at 250,000 taels, of which the Governor-General gave 100,000 taels, the other 3|5 being defrayed out of the proceeds of a British municipal loan at 6 per cent., secured by a levy of 1 per cent. on the customs duties paid by all merchandise, or ½ per mille *ad valorem*. These locks were on the point of completion when the troubles broke out, but a great deal of damage was done to them subsequently, and the indemnity claimed in respect thereof was 126,000 taels.

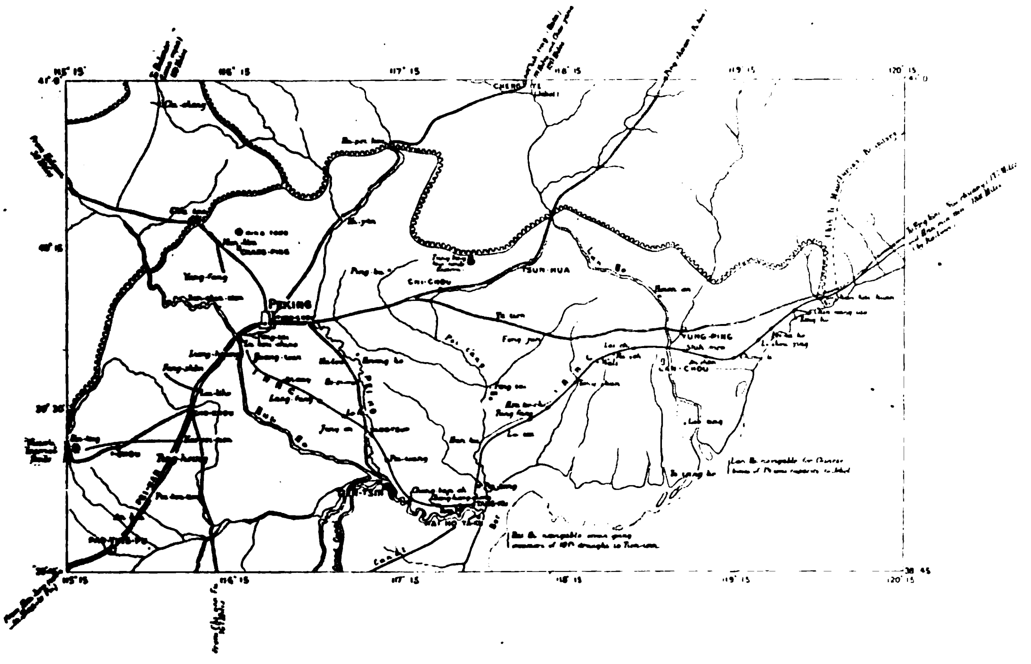
The provisional government, on taking over the city, lost no time in devoting its attention to the matter of conservancy; in fact, until the Hai-ho Conservancy Board was constituted in 1901, they assumed control of the works, meeting all necessary expenses. This Board, which consists of three members, a representative of the Chinese Government, the Senior Consul, and the Commissioner of Customs, to whom are added, with consultative voice only, representatives of commerce, shipping, and the concessions and settlements, obtained authority to raise in 1902 a second loan of 250,000 taels, guaranteed by an additional levy of ½ per mille on all imports and exports, for the purpose of shortening the river by cutting across the five most difficult bends. Towards the maintenance of conservancy works the Chinese Government has, in terms of Article XI of the Peace Protocol in 1901, to contribute a sum of 60,000 Haikuan taels per annum.

After the damage to the old works had been repaired, the systematic straightening of the channel was commenced in October, 1901, under the superintendence of Mr. A. de Linde, a Danish engineer, who has been connected with the river improvement schemes since their inception. By December, 1902, the board was able to report the completion of two cuttings, one ¾ of a mile and the other 1|10 of a mile long, which have shortened the distance from the bar by 4¾ miles, and have enabled steamers drawing 10 feet 6 inches to reach the Bund in seven to eight hours. The third cutting, about 2 1|10 miles in length, does away with several bad curves and shortens the distance by 5 miles. When the two other projected cuttings shall have been completed, the total distance from Tientsin to the sea—originally 51 miles—will have been reduced to 37 miles, and four more rectangular bends will have been circumvented.

Bar Work.—There is, however, little object in having a river navigable for vessels drawing 13 feet, if they can not get over the bar at its mouth on a lower draught than 8 to 10 feet, and the raising of funds to deepen the bar is the next problem which confronts the mercantile and shipping communities. While the river was in process of silting up, the bar extended farther out to sea, and the pecuniary loss incurred by those concerned, through the detention of steamers and the cost of partial lighterage, imposes in the aggregate a very heavy tax on the trade of the port. Northerly and westerly winds in the Autumn invariably cause low water, and, although those interested may regard with equanimity the spectacle of six steamers lying there for days at a time, the outsider is at a loss to conceive how such a state of things can not but affect trade adversely.

A survey of the bar was carried out in July and August, 1902, by H.M.S. *Rambler*, and an estimate of the cost of deepening the bar channel to 14 feet calls for an expenditure of 450,000 taels on the purchase of two dredgers, and of 70,000 taels per annum for the cost of dredging and works generally. The bar must be dredged to at least 7 feet below its present level to allow steamers with a 14 feet draught crossing it with a tide of 8 feet. To raise funds for this purpose the sum of 145,000 taels per annum is required, and it is proposed to obtain sanction to levy 15 candareens per ton (net register) on all steamers crossing the bar, and to impose on goods a separate ½ per mille charge to be devoted exclusively to bar works as distinct from river conservancy. It is understood that the steamer companies trading to Tientsin, with the exception of one company, which is not satisfied that a careful and complete investigation of the question has been made, are willing to agree to a charge of 1 mace per ton, but decline to accede to a levy of the higher amount. The majority of the steamship companies have built steamers specially designed for carrying cargoes on a low draught, and are said to be averse to let all comers in on an equal footing.

Chinwangtao.—The year 1904 will probably be recorded in the annals of Chinwangtao as

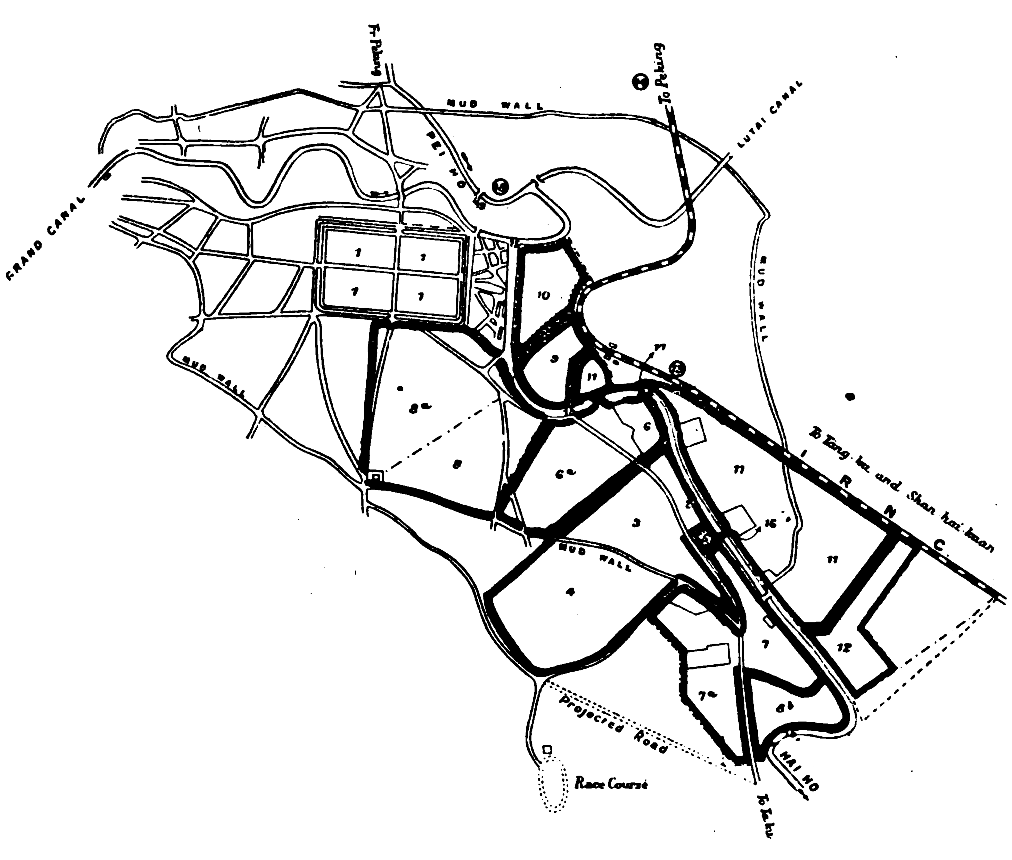


TIENTSIN, THE TRADE CENTER OF NORTH CHINA

the year in which the infant port made its first few tottering steps without the parent's support. Whether these steps will lead straight to an independent existence worthy of mention besides the subordinate *role* as a winter jetty of Tientsin, which must remain its principal function for many a year to come, can not be foretold even at the time of writing this, but there are many hopeful signs that the next winter season will witness a further development of the remarkable progress made in the season 1904-05. The first impulse was derived from the establishment during the second half of 1904 of a permanent coolie embarking station by the Transvaal Chamber of Mines Labor Agency. This brought at once a great amount of life and activity to the port, and directed the attention to additional possibilities and openings for shipping and trade. In connection with these impending developments the Maritime Customs enlarged the scope and functions of their local office, now in charge of a deputy commissioner, added a Haikwan Bank for convenience of local duty payers, and transferred the entire establishment, including the imperial post office, to a new building erected for that purpose. Meanwhile, it was necessary to regulate and secure the most favorable inland duty treatment for a future trade, which then showed incipient tendencies, between Chinwangtao and its North-eastern "hinterland"—Fengtien, Kirin, etc.,—especially during the winter months. This has now (March, 1905) been accomplished, and in general principles adopted, which will secure trade between the regions named and southern ports against arbitrary inland taxes. But, needless to say, the fiscal smoothing of the way is not everything. The remaining power to foster and develop this trade lies in the hands of the Imperial Railways of North China and of the Chinese Engineering and Mining Company, whose sole control of everything that concerns the shipping facilities of the port, and its connections with the main railway line up to the present moment still amount to an almost absolute power over the trade and its chance of development so long as the present status and conditions remain as they are. After guarding a virtual monopoly of the use of its piers and jetties for some years, this company decided, in the course of 1904, to extend facilities to the steamers of other companies; albeit, on its own terms and with retention of minor monopolies, such as the provision of stevedores and coolies of all kinds. The result was a great development during the last weeks of 1904 and subsequent months, as many as 10 steamers at a time being within the port limits on certain days. The main portion of this tonnage was employed for Tientsin cargo, carried practically in bulk to and from Chinwangtao by railway. But the feature of the 1904-05 season has been the springing up in appreciable proportions of a Chinwangtao local trade, *i.e.*, goods landed at the port were "cleared Customs" on the spot and sent straight to the populous and thriving markets in the neighborhood—Lanchou, Yung-p'ing, Shanhaikwan, etc. Up to now this trade has been in the hands of a single Chinese firm with extensive southern connections. As to the extra-mural trade by rail through Shanhaikwan, so far most of it has consisted of supplies, liquors, etc., forwarded to the war area by adventurous traders throughout the winter. One or two healtheir trade feelers have, however, come forward in the shape of considerable shipments of beans from Fengtien to southern ports via Chinwangtao. It is reported that these shipments will take place regularly every winter from the closing to the opening of the port of Newchwang. When the facilities for a continuation of winter trade in these regions become better known and appreciated, we may look forward to great developments of the erstwhile Tientsin jetty, both as a shipping port of extra-mural provinces during the winter and a mediator of a flourishing local trade throughout the year.

SHIPPING.—The advance in shipping and tonnage during recent years has been slow, if at all noticeable. Not only have the figures of the extraordinary year, 1902, never been approached, but those for 1899 still maintain their second position. Tonnage at Chinwangtao has now expanded into almost one-quarter of that which lifts itself wearily over the Taku Bar.

IMPORTS.—As a rule there is little information to be conveyed in a small compass on the subject of imports. The relative importance of the various foreign staples and the main factors determining their periodical fluctuations apply practically to all ports alike, and are usually better known outside of China than within.



SKETCH OF TIENTSIN.—EXPLANATION:—1. Chinese city (walls pulled down to form roads). 2. British original concession. 3. British extension (settlement). 4. British extension (extra mural). 5. American concession. 6. French concession. 6A. French extension. 7. German settlement. 7A. German extension. 8. Japanese settlement. 8A. Japanese extension. 8B. Japanese additional extension (8A and 8B administered by the Chinese Government). 9. Italian settlement. 10. Austro-Hungarian settlement. 11. Russian settlement. 12. Belgian settlement (not occupied). 13. Railway station (Tientsin settlement): 14. Railway station (Tientsin city). 15. Hai ho. 16. Proposed Russian bridge. 17. International bridge. 18. Yamen of the Governor-General. 19. Iron bridge. 20. East Arsenal (French barracks).

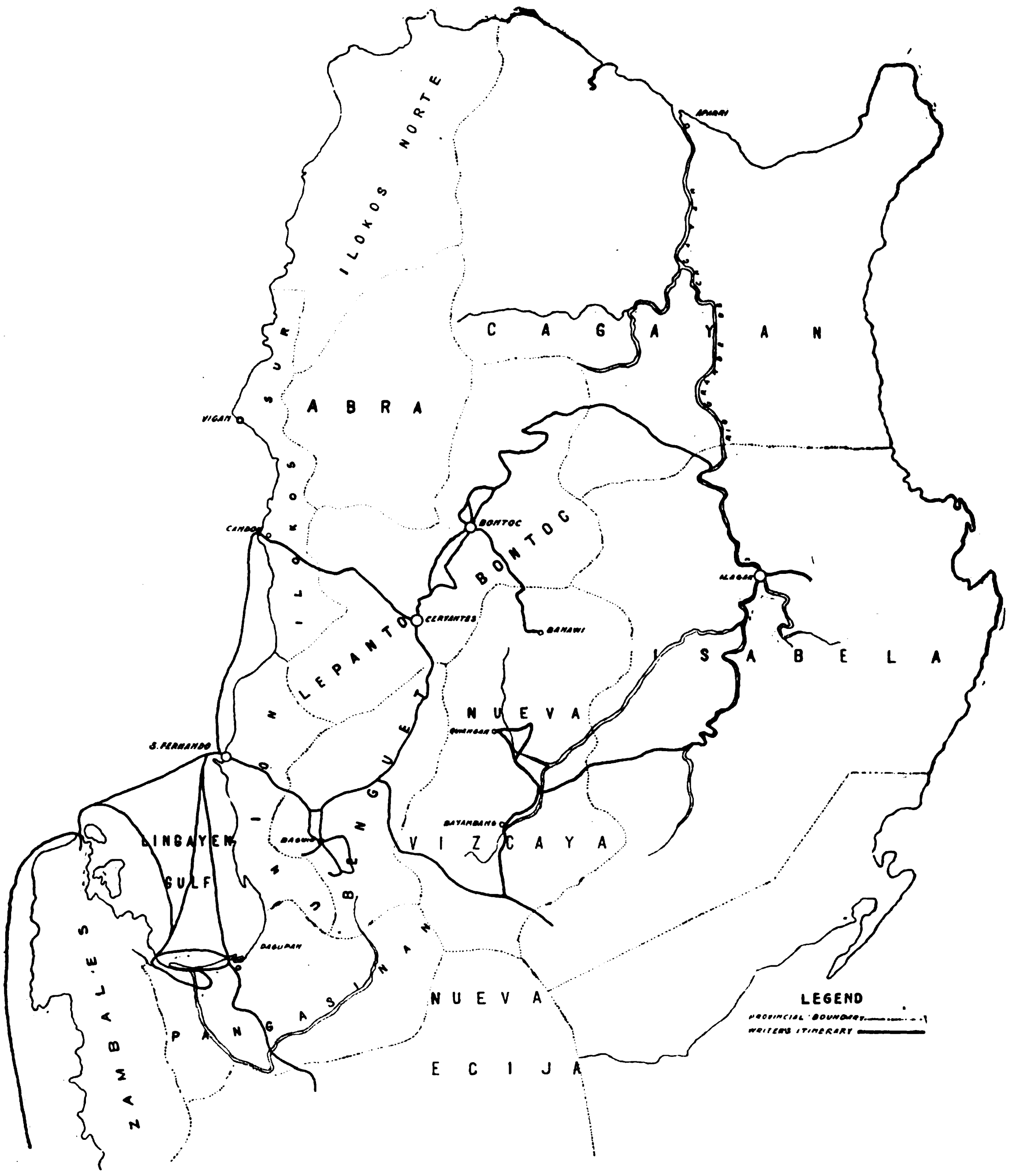
IRRIGATION AS PRACTICED BY BONTOC IGOROTS OF NORTHERN LUZON, P. I.

Dr. Albert Ernest Jenks, who severed his connection with the Philippine Government at the beginning of the current month, as chief of the Ethnological Survey, on account of ill-health, and sailed for his home in Elroy, Wisconsin, issued on the eve of his resignation a most instructive volume devoted to an exhaustive study of the Igorot Tribe which inhabits the Bontoc section of the present Province of Lepanto-Bontoc. While the study of this people is, on the whole, of most absorbing interest, in all of Igorot culture the most apparent and strikingly noteworthy fact is his agriculture under an extensive and original system of irirgation.* In this industry the Igorot has reached his highest development. On agriculture hangs his claim to the rank of barbarian—without it he would be a savage.

Dr. Jenks says that Igorot agriculture is unique in the Island of Luzon, and, so far as known, throughout the whole Philippine Archipelago, in its mountain terraces and irrigation.

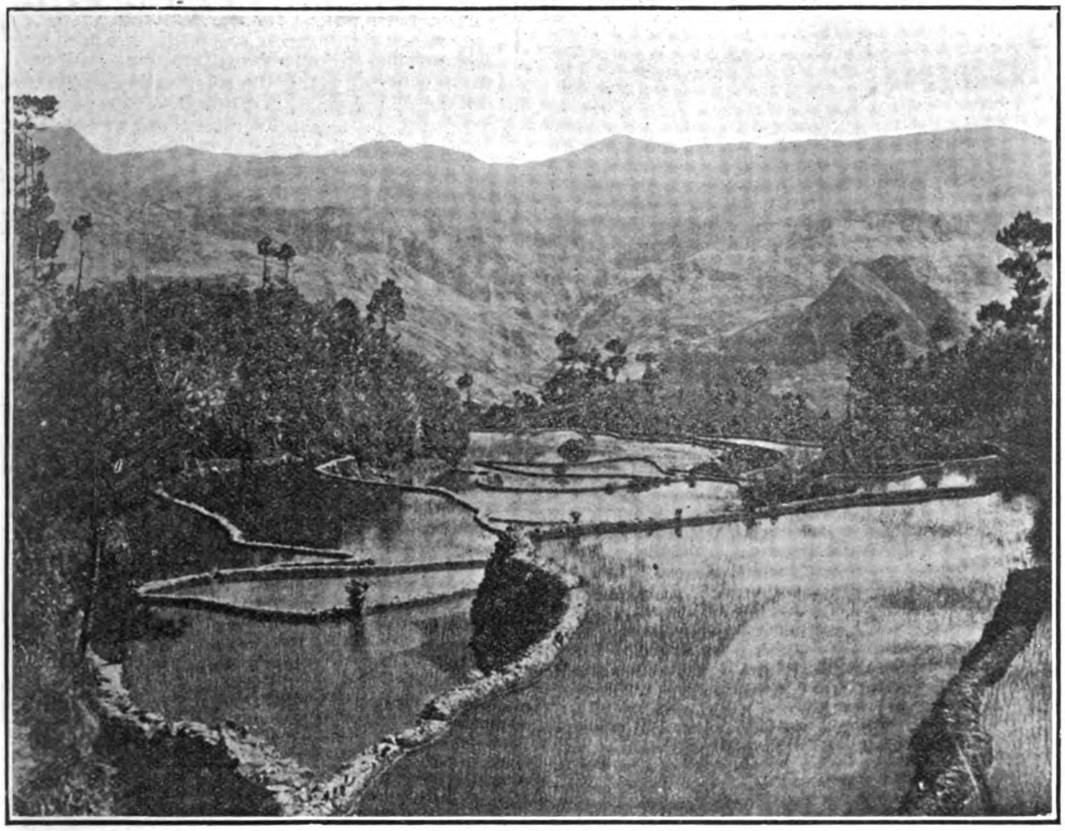
There are three possible explanations of the origin of Philippine rice terraces, according to Dr. Jenks. First, that they (and those of other islands peopled by primitive and modern Malayans, and those of Japan and China) are indigenous—the product of the mountain lands of each isolated area; second, that most of them are due to cultural influences from one center, or possibly more than one center, to the North of Luzon—as influences from China or Japan spreading southward from island to island; third, that they, especially all those of the Islands— excluding only China—are due to influences originating South of the Philippines, spreading northward from island to island. Terracing may be indigenous to many isolated areas where it is found, and doubtless is to some; it is found more or less marked wherever irrigation is or was practiced in ancient or modern agriculture. However, it is believed not to be an original production of the Philippines. Certain it is that it is not a Negrito art, nor does it belong to the Moro or the so-called Christian tribes of the Islands.

Different sections of China have rice terraces, and as early as the XIIIth Century Chinese merchants traded with the Philippines, yet there is no record that they traded North of Manila—where terracing is alone found. Besides, the Chinese record of the early commerce with the Islands—written by Chao Jukua about 1250, it is claimed,—specifically, states that the natives of the Philippines were the merchants, taking the foods from the shore and trading them even to other islands; the Chinese did not pass inland. Even though the Chinese brought phases of his culture to the Islands, it would not have been agriculture, since he did not practice it here. Moreover, whatever culture he did leave would not, according to Dr. Jenks' reasoning, be



SKETCH MAP OF NORTHRRN LUZON

* Illustrations, courtesy Ethnological Survey.



BONTOC IGOROTS.—A GLIMPSE OF IGOROT LAND.

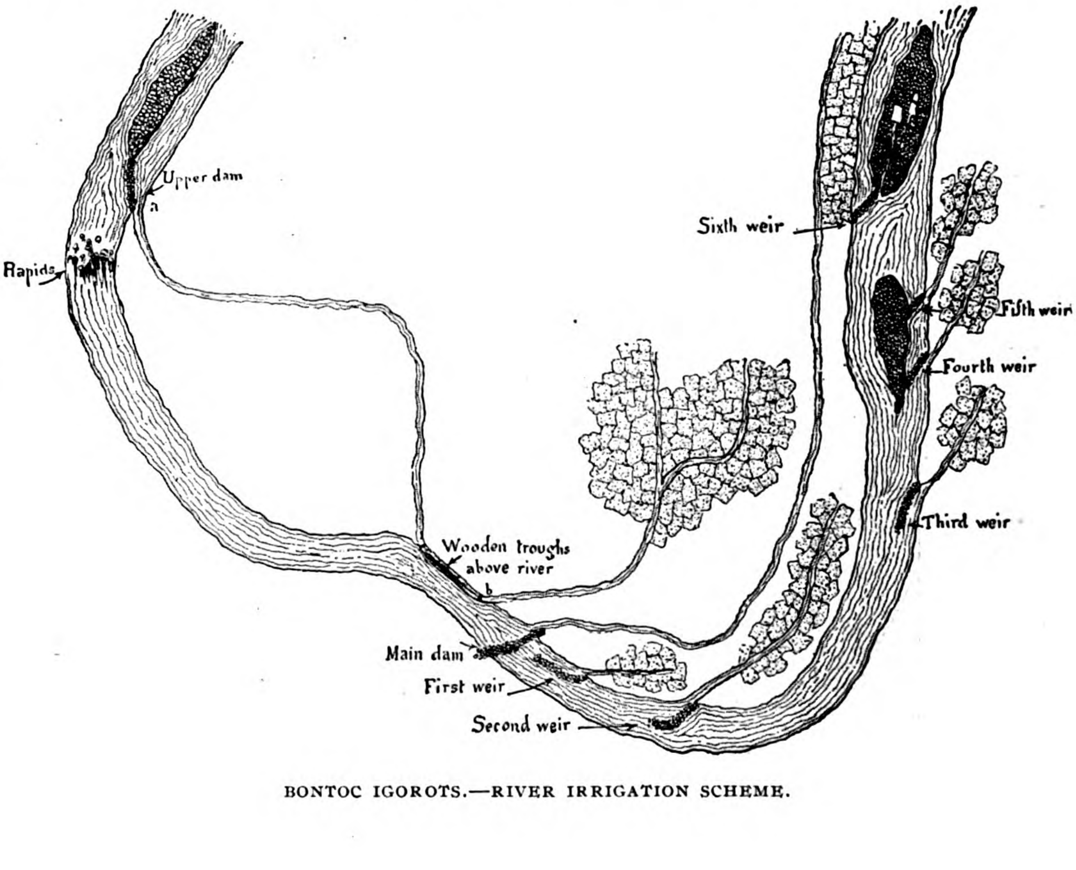
found in the mountains three or four days inland, while the people with whom he traded were without the art. The same argument holds against the Japanese as the inspirers of Igorot terraces. There is no record that they traded in the Islands as early as did the Chinese, and it is safe to say, no matter when they were along the coasts of Luzon, that they never penetrated several days into the mountains, among a wild head-hunting people, for what the agricultural Igorot had to sell.

The historic cultural movements in Malaysia have been not from the North southward but from Sumatra and Java to the North and East; they have followed the migrations of the people. It is believed that the terrace-building culture of the Asiatic islands for the production of mountain rice by irrigation during the dry season has drawn its inspiration from one source, and that such terraces where found today in Java, Lombok, Luzon, Formosa, and Japan are a survival of very early culture which spread from the nest of the primitive Malayan stock and left its mark along the way—doubtless in other islands besides those cited. If Japan, as has Formosa, had an early Malayan culture, as will probably be proved in due time, one should not be surprised to find old rice terraces in the mountains of Batanes Islands and the Loo Choo Islands which lie between Luzon and Japan.

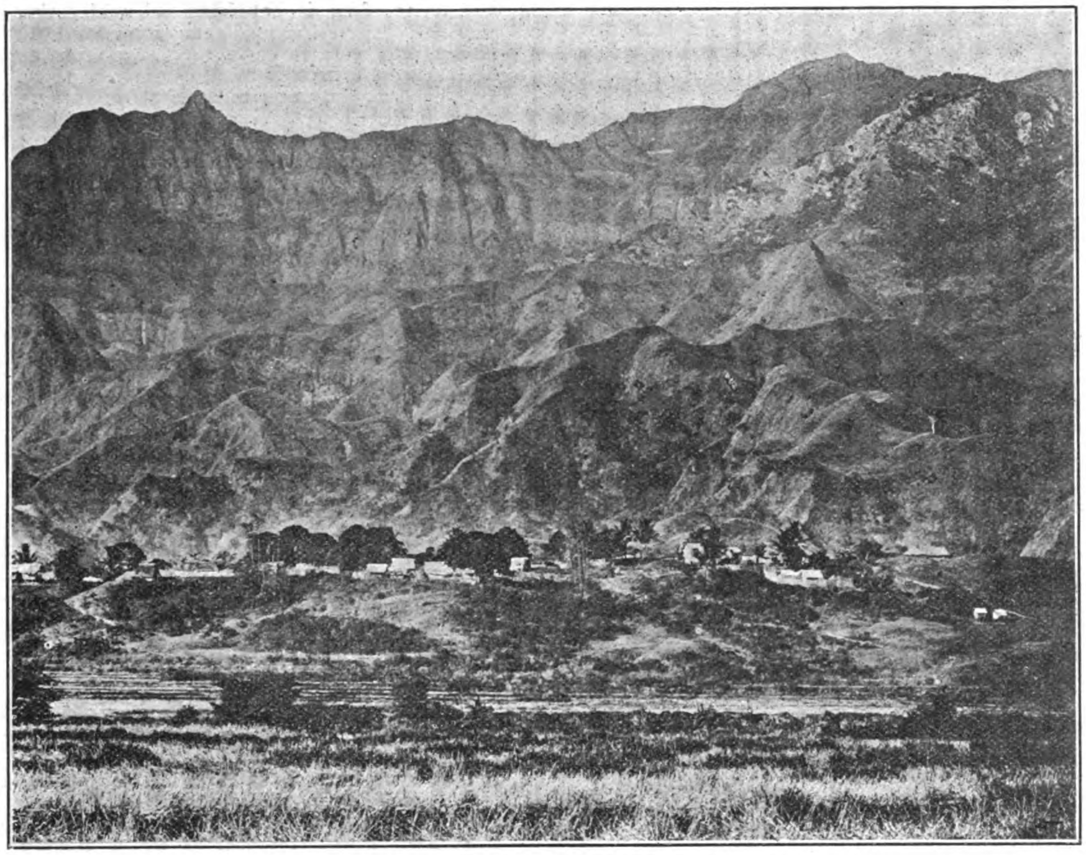
BUILDING THE SEMENTERA.—There are two varieties of sementeras—garden patches, called *pay-yo*—in the Bontoc area, the irrigated and the unirrigated. The irrigated sementeras grow two crops annually, one of rice by irrigation during the dry season and the other of *camotes* (sweet potatoes), grown in the rainy season without irrigation. The unirrigated sementera is of two kinds. One is the mountain or side-hill plat of earth, in which *camotes*, millet, beans, maize, etc., are planted, and the other is the horizontal plat (probably once an irrigated sementera), usually built with low terraces, sometimes lying in the pueblo among the houses, from which shoots are taken for transplanting in the distant sementeras and where *camotes* are grown for the pigs. Sometimes they are along old water courses which no longer flow during the dry season; such are often employed for rice during the rainy season.

The unirrigated mountain-side sementera, called *fo-ag*, is built by simply clearing the trees and brush from a mountain plat. No effort is made to level it and no dike walls are built. Now and then one is hemmed in by a boundary wall.

The irrigated sementeras are built with much care and labor. The earth is first cleared; the soil is carefully removed and placed in a pile; the rocks are dug out; the ground shaped, being excavated and filled until a level results. This task for a man whose only tools are sticks is no slight one. A huge boulder in the ground means hours—often days—of patient, animal-like digging and prying with hands and sticks before it is finally dislodged. When the ground is leveled the soil is put back over the plat, and very often is supplemented with other rich soil. These irrigated sementeras are built along water courses or in such places as can be reached by turning running water to them. Inasmuch as the water must flow from one to another, there are practically no two sementeras on the same level which are irrigated from the same water course. The result is that every plat is upheld on its lower side, and usually on one or both ends, by a terrace wall. Much of the mountain land is well supplied with bowlders and there is an endless water-worn supply in the beds of all streams. All terrace walls are built of these undressed stones piled together without cement or earth. These walls are called *fa-ning*. They are from 1 to 20 and 30 ft. high and from 1 ft. to 18 in. wide at the top. The upper surface of the top layer of stones is quite flat and becomes the path among the sementeras. The toiler ascends and descends among the terraces on stone steps by single rocks projecting from the outside of the wall at regular intervals and at an angle easy of ascent and decent (see illustration "A Terrace Wall"). These stone walls are usually weeded perfectly clean at least once a year, generally at the time the sementera is prepared for transplanting. This work falls to the women (see illustration "Women Weeding a Terrace Wall at Soil-Turning Season"), who commonly perform it entirely nude. At times a scanty frock-and-back apron of leaves is worn tucked under the girdle. In the Banawi District, South of the Bontoc area, there are terrace walls certainly 75 ft. in height, though many of these are not stones, since the earth is of such a nature that it does not readily crumble. It is safe to say that 9|10 of the available water supply of the dry season in the Bontoc area is utilized for irrigation. In some areas, as about Bontoc Pueblo (see illustration "The Entrance to Bontoc Pueblo," etc.), there is practically not a gallon of unused water where there is space for a sementera. A single area consisting of several thousand acres of mountain side is frequently devoted to sementeras, and Dr. Jenks says he has yet to behold a more beautiful view of cultivated land than such an area of Igorot rice terraces. Winding in and out, following every projection, dipping into every pocket of the mountain, the walls ramble along like running things alive. Like giant stairways the terraces lead up and down the mountain side, and, whether the levels are empty, dirt-coated areas, fresh, green-carpeted stairs, or patches of ripening, yellow grain, the beholder is struck with the beauty of the arti-



BONTOC IGOROTS.—RIVER IRRIGATION SCHEME.



BONTOC IGOROTS.—TILUD PASS, EAST SIDE.

ficial landscape and marvels at the industry of an otherwise savage people.

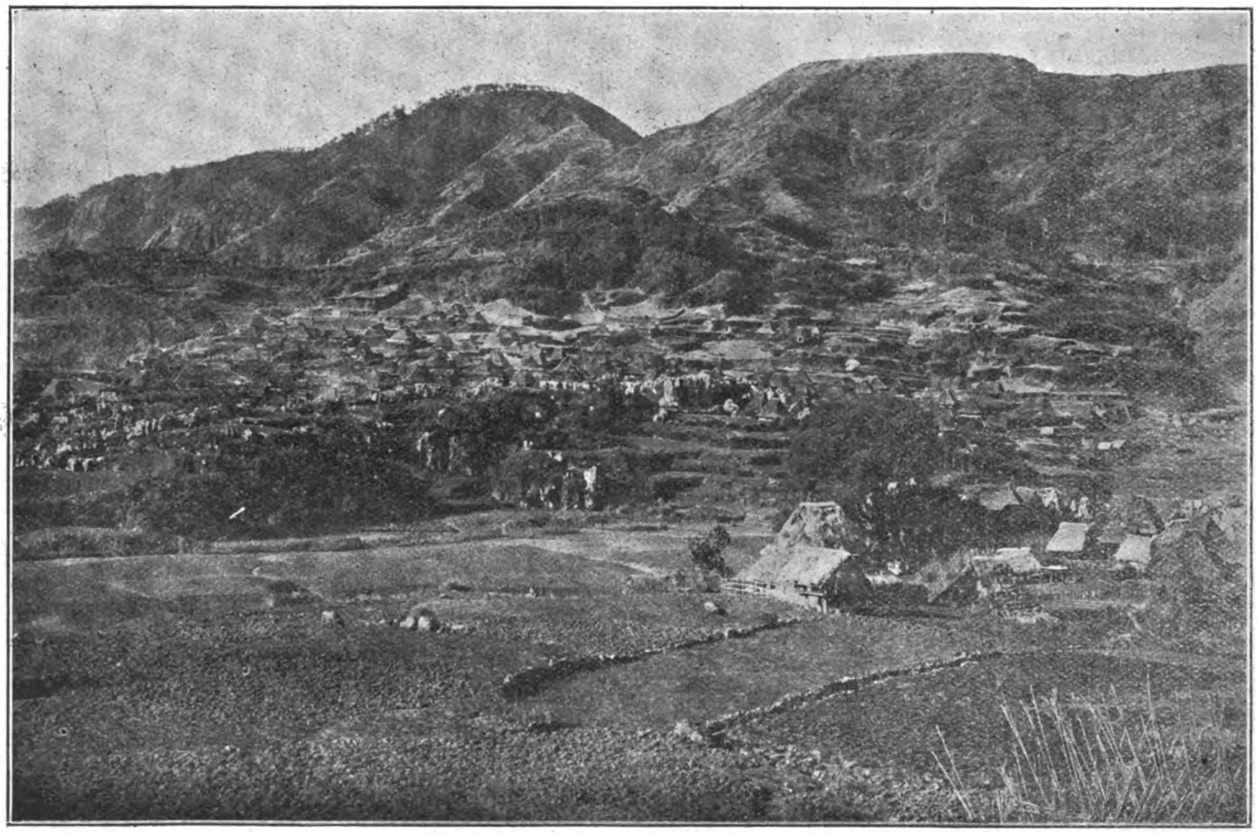
IRRIGATION.—The Igorot employs three methods of irrigation: One, the simplest and most natural, is to build sementeras along a small stream which is turned into the upper sementera and passes from one to another, falling from terrace to terrace until all water is absorbed, evaporated, or all available desirable land is irrigated. Usually such streams are diverted from their courses, and they are often carried long distances out of their natural way. The second method is to divert a part of a river by means of a stone dam. The third method is still more artificial than the preceding—the water is lifted by direct human power from below the sementera and poured to run over the surface.

The first method is the most common, since the mountains in Igorot land are full of small, usually perpetual, streams. There are practically no streams within reach of suitable pueblo sites which are not exhausted by the Igorot agriculturist. Everywhere small streams are carefully guarded and turned wherever there is a square yard of earth that may be made into a rice sementera. Small streams in some cases have been wound for miles around the side of a mountain, passing deep gullies and rivers in wooden troughs or tubes.

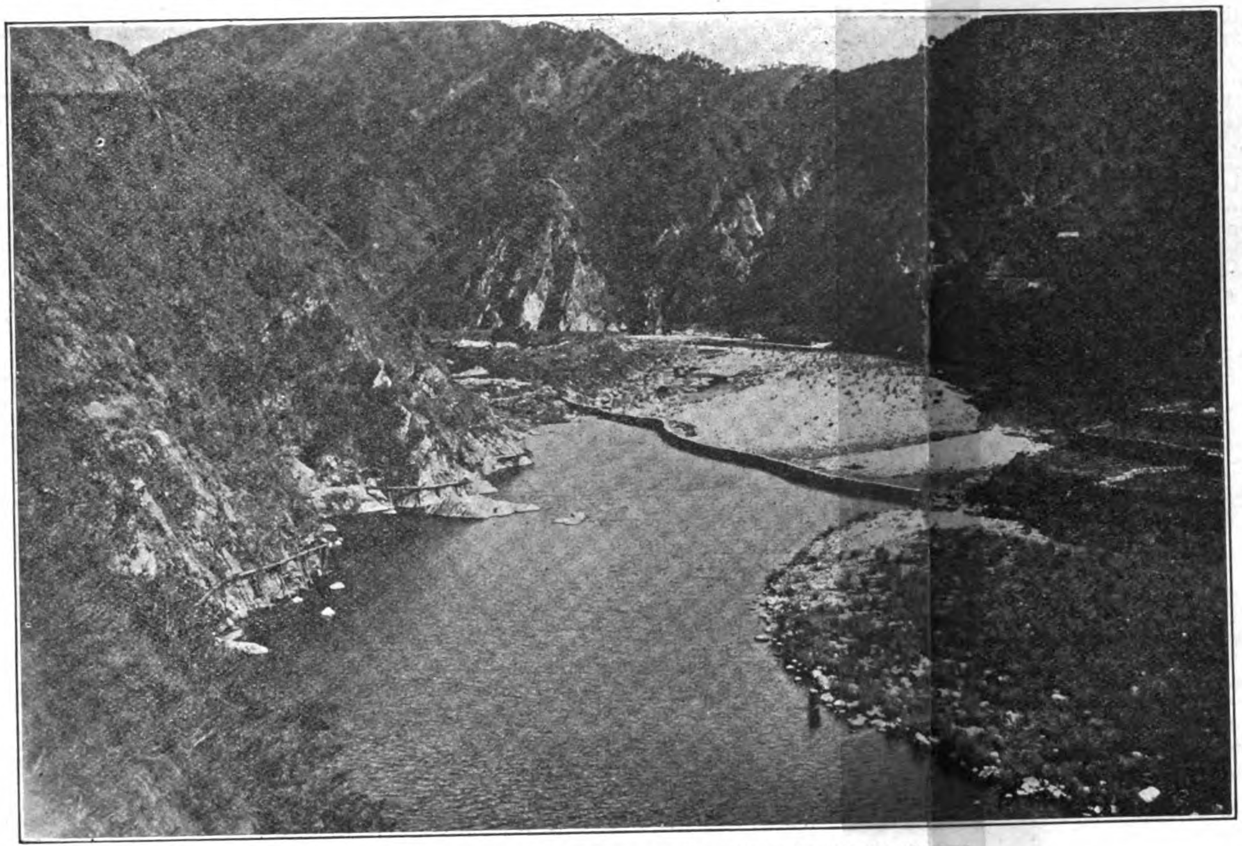
Much land along the river valleys is irrigated by means of dams, called by the Igorot *lung-ud'*. During the season of 1903 there was one dam (see plan "River Irrigation Scheme;" also illustrations "Partial View of Bontoc Irrigating Works" and "The Main Dam, Showing Irrigating Troughs Beyond") across the entire river at Bontoc, throwing all the water which did not leak through the stones into a large canal on the Bontoc side of the valley. Half a mile above this was another dam (called the upper dam in the plan of the "River Irrigation Scheme") diverting one-half of the stream to the same valley, only on to higher ground. Immediately below the main dam were two low piles of stones (designated wiers) jutting into the shallow stream from the Bontoc side, and each gathering sufficient water for a few sementeras. Within a quarter of a mile below the main dam were three other loose, open wiers of rocks, two of which began on a shallow island, throwing water to the Samoki side of the river. In the stream a short distance further down a shallow row of rocks and gravel turned water into three new sementeras constructed early in the year on a gravel island in the river.

The main dam is about 12 ft. high, 2 ft. broad at the top, 8 or 10 ft. at the bottom, and is about 300 ft. long. It is built each year during November and December, and requires the labor of fifteen or twenty men about six weeks. It is constructed of river-worn bowlders piled together without adhesive. The top stones are flat on the upper surface, and the dam is a pathway across the river for the people from the time of its completion until its destruction by the freshets of June and July.

The upper dam is a new piece of primitive engineering. It, with its canal, has been in mind for at least two years; but it was completed only in 1903. The dam is small, extending only half way across the river, and beginning on an island. This dam turns water into a canal averaging 3 ft. wide and carrying about 5 in. of water. The canal, called *á-lak*, is about 3,000 ft. long from the dam at *a* in plan of "River Irrigation Scheme" to the place of discharge into the level area *k* at *b*. For about 530 ft. of this distance it was impossible



BONTOC IGOROTS.—PUEBLO OF SAGADA.

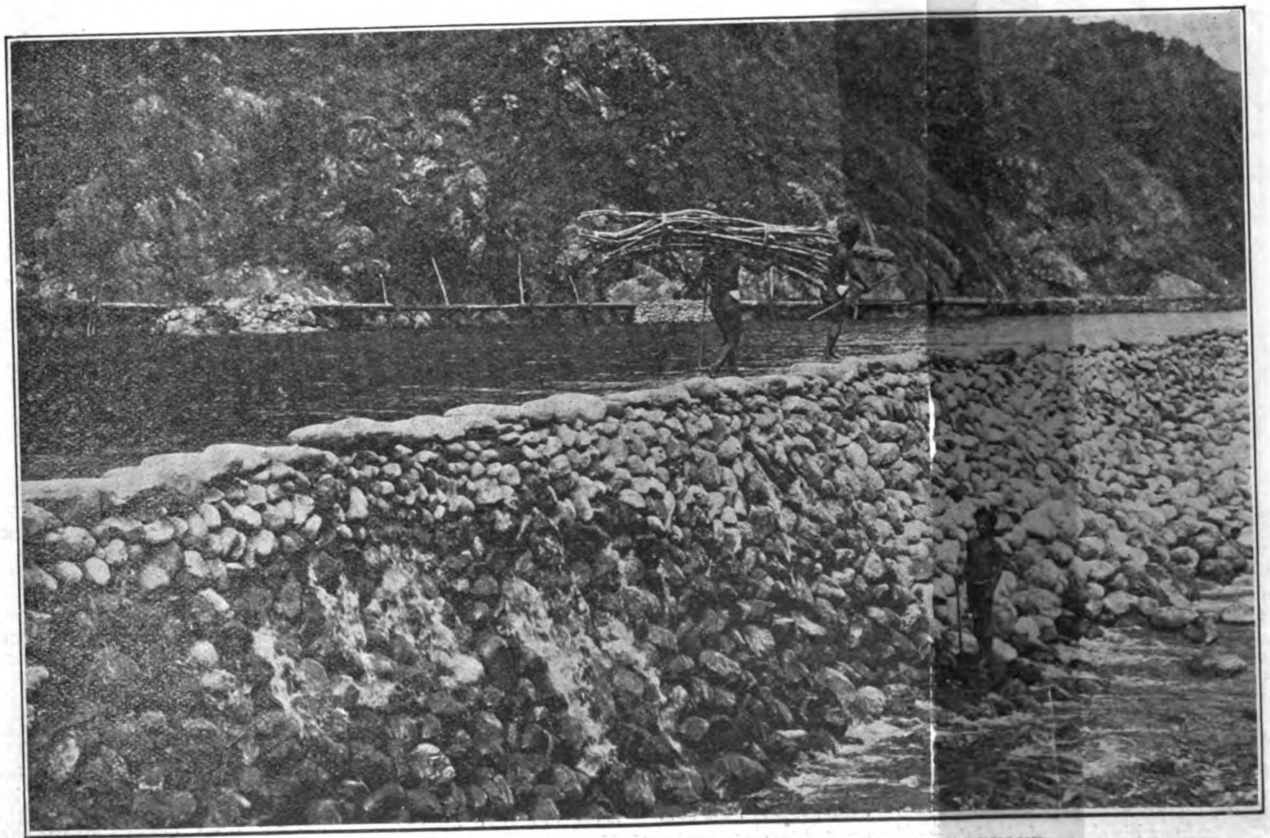


BONTOC IGOROTS.—PARTIAL VIEW OF BONTOC IRRIGATION WORKS.

for the primitive engineer to construct a canal in the earth, as the solid rock of the mountain dips vertically into the river. About fifty sections of large pine trees were brought and hollowed into troughs, called *ta-la'-kan*, which have been secured above the water by means of buttresses, by wooden scaffolding, called *to-kod'*, and by attachment to the overhanging rocks, until there is now a continuous artificial waterway from the dam to the tract of irrigated land.

Considerable engineering sense has been shown and no small amount of labor expended in the construction of this last irrigating scheme. The pine logs are a foot or more in diameter, and have a waterway dug in them about 10 or 12 in. deep and wide. These trees were felled and the troughs dug with the wasay, a short-handled tool with an iron blade only an inch or an inch and a half wide, and convertible alike into ax and adz.

There seems to be a fall of about 22 ft. between *a* at the upper dam and *b* at the discharge from the troughs. This estimate was obtained by a primitive surveying outfit as follows: A rifle, with a bottle attached, used for a liquid level, was sighted from a camera tripod. A measuring tape attached to the tripod showed the distance of the rifle above the surface of the water. A surveyor's tape measured the distance between the tripod and the leveling rod, which also had an attached tape to show the distance of the point sighted above the surface of the water. The strength of the scaffolding supporting the troughs is suggested by the statement that the troughs were brimming full of swift-running water, while the "surveying" party of four adults, accompanied by half a dozen juvenile Igorot sightseers, weighed about 900 pounds, and was often distributed along in the troughs, which they waded within a space of 30 ft.



BONTOC IGOROTS.—THE MAIN DAM, SHOWING IRRIGATION TROUGHS BEYOND.

This fall in a distance of about 3,000 ft. seems needlessly great; however, the primitive engineer has shown excellent judgment in the matter. First, by putting the dam (upper dam) where it is, only half the stream had to be built across. Second, there is a rapids immediately below the dam, and, had the Igorot built his dam below the rapids, a dam of the same height would have raised the water to a much lower level; this would have necessitated a canal probably 10 or 12 ft. deep instead of three. Third, the height of the water at the upper dam has enabled him to lay the log section of the waterway above the high-water mark of the river, thus, probably, insuring more or less permanence. Had the dam been built much lower down the stream the troughs would have been near the surface of the river and been torn away annually by the freshets, or the people would be obliged each year to tear down and reconstruct that part of the canal. As it now is it is probable that only the short dam will need to be rebuilt each year.

All dams and irrigating canals are built directly by or at the expense of the persons benefited by the water. Water is never rented to persons with sementeras along an artificial waterway. If a person refuses to bear his share of the labor of construction and maintenance his sementeras must lie idle for lack of water.

All sementera owners along a waterway, whether it is natural or artificial, meet and agree in regard to the division of the water. If there is an abundance, all open and close their sluice gates when they please. When there is not sufficient water for this, a division is made—usually each person takes all the water during a certain period of time. This scheme is supposed to be the best, since the flow should be sufficient fully to flood the entire plat—a 100-gal. flow in two hours is considered much better than an equal flow in two days.

During the irrigating season, if there is lack of water, it becomes necessary for each sementera owner to guard his water rights against other persons on the same creek or canal. If a man sleeps in his house during the period in which his sementeras are supposed to receive water, it is pretty certain that his supply will be stolen, and, since he was not on guard, he has no redress. But should sleep chance to overtake him in his tiresome watch at the sementeras, and should some one turn off and steal his water, the theif will get clubbed if caught, and will forfeit his own share of water when his next period arrives.

The third method of irrigation—lifting the water by direct human power—is not much employed by the Igorot. In the vicinity of Bontoc pueblo there are a few sementeras which were never in a position to be irrigated by running water. They are called *pay-yo' a kao-u'-chan*, and, when planted with rice in the dry season, need to be constantly tended by toilers who bring water to them in pots from the river, creeks, or canals. On the Samoki side of the valley during a week or so of the driest weather in May, 1903, there were four "well sweeps," each with a 5-gal. kerosone-oil can attached, operating nearly all day, pouring water from a canal into sementeras through 60 or 80 ft. of small, wooden troughs.

BONTOC IGOROTS.—THE ENTRANCE TO BONTOC

IMPROVEMENT OF PORT AND RIVER

(Concluded from page 64.)

have been deposited, completing the rip-rap mound to low water and 1,530 ft. of the superstructure. 5,589,333.8 cub. yds. of material have been dredged; 4,880,937.3 cub. yds. having been deposited in the space behind the bulkhead, filling it to the proposed grade;

701,323.5 cub. yds. in the moat around the Walled City and in the low ground S. of the City Hall; and 7,093 cub. yds. in Engineer Island.

The 5,000,000 cub. yds. of dredging provided for in the original contract has not been sufficient to complete the excavation of the proposed harbor, due principally to the expansion of the material when measured in fill.

By Act 1360 dated June 26th, 1905, the Philippine Commission has authorized the entering into contract with the Atlantic, Gulf and Pacific Company for the excavation of about 2,000,000 cub. yds. additional of which about 1,500,000 is to be deposited behind a bulkhead in front of the Luneta, and about 400,000 cub. yds. deposited on the existing fill to bring it to an elevation of about ten ft. after settlement, and for a rip-rap foundation of a pier extending from the outer end of the E. breakwater 1000 ft. at right angles to the bulkhead, which is required to prevent the flow of mud into the dredged area, and which can be utilized for a portion of the wharf system of the port.

The building of a concrete foundation for the light-house at the outer end of the W. breakwater has also been included in the contract.

By Resolution of the Philippine Commission of May 2nd, 1905, $550,000 United States currency (1,100,000 pesos Philippines currency) was declared to be reserved from the proceeds to be derived from the next issue of public improvement bonds, for constructing two wharves. The dimensions of the wharves are 400x70 ft. and 650x110 ft. They will be constructed with a steel superstructure and concrete floor supported on concrete piers having a pile foundation.

Plans and specifications have also been prepared by this office for the construction of a timber wharf 500x50 ft. in the outer harbor, and one 313x25 ft. in the inner basin for the use of the Quartermaster's Department, U. S. Army, which are to be built from funds appropriated by the United States Government.

These plans have been prepared by Assistant Engineer H. C. DeLano, who has had local charge of the work since October, 1904.

MANILA SHIPPING, 1899-1905.—The following statement of the entrance and clearance of vessels by fiscal years since American occupation has been furnished by the Collector of Customs for the Philippine Islands:

MANILA, COASTWISE.

	ENTERED.		CLEARED.	
Year	Vessels	Tonnage	Vessels	Tonnage
1899	583	149,129	723	165,161
1900	1,280	240,897	1,310	255,104
1901	1.792	341,853	1,831	354,940
1902	1,660	328.571	1,742	359,359
1903	2.023	388,468	2,045	389,355
1904	2,102	441,320	2,116	435,201
1905*	1,976	425,434	1,990	428,643

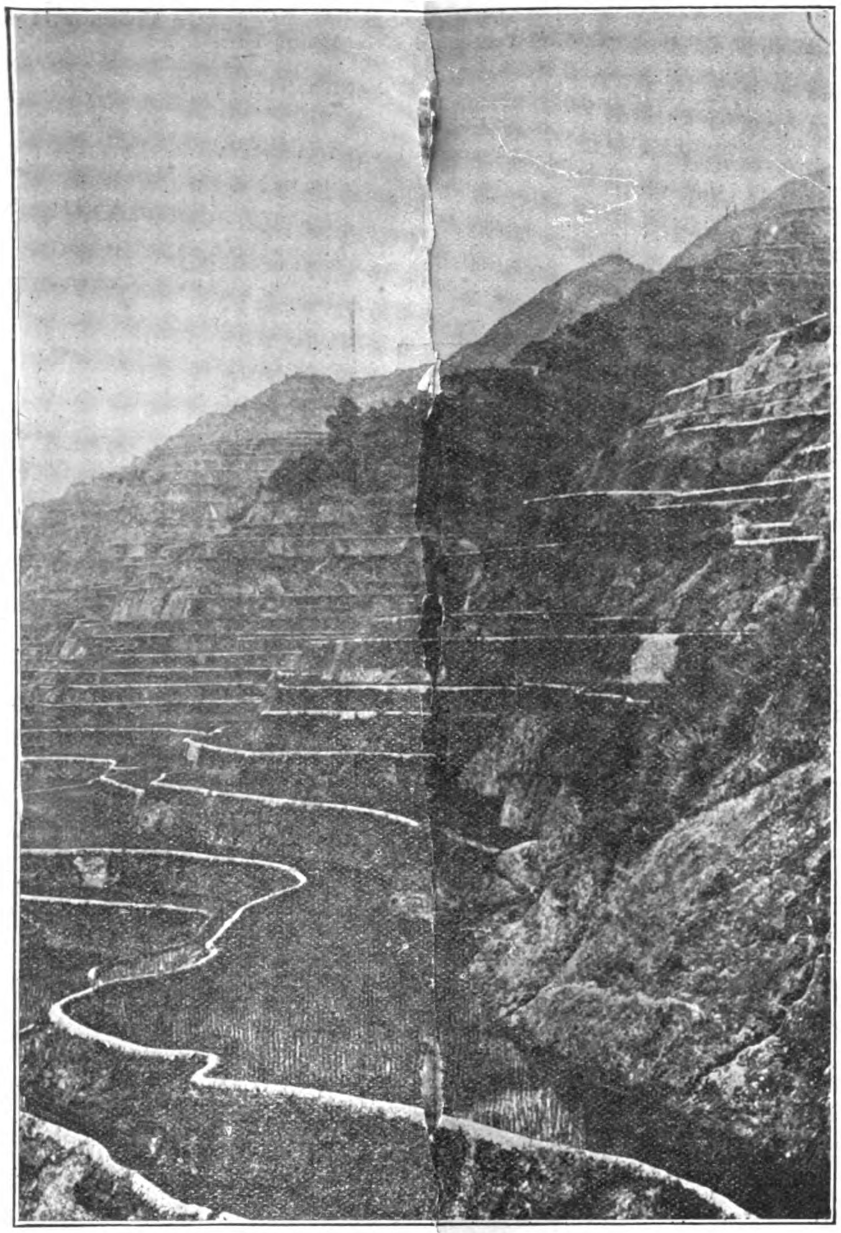
MANILA, FOREIGN.

1899	232	260,545	238	291,649
1900	412	542,058	345	501.522
1901	521	814,241	400	762,930
1902	577	912,982	514	881,985
1903	662	1,179,349	649	1,198,937
1904	635	1,247,959	643	1,222,356
1905*	579	1,113,938	578	1,005,038

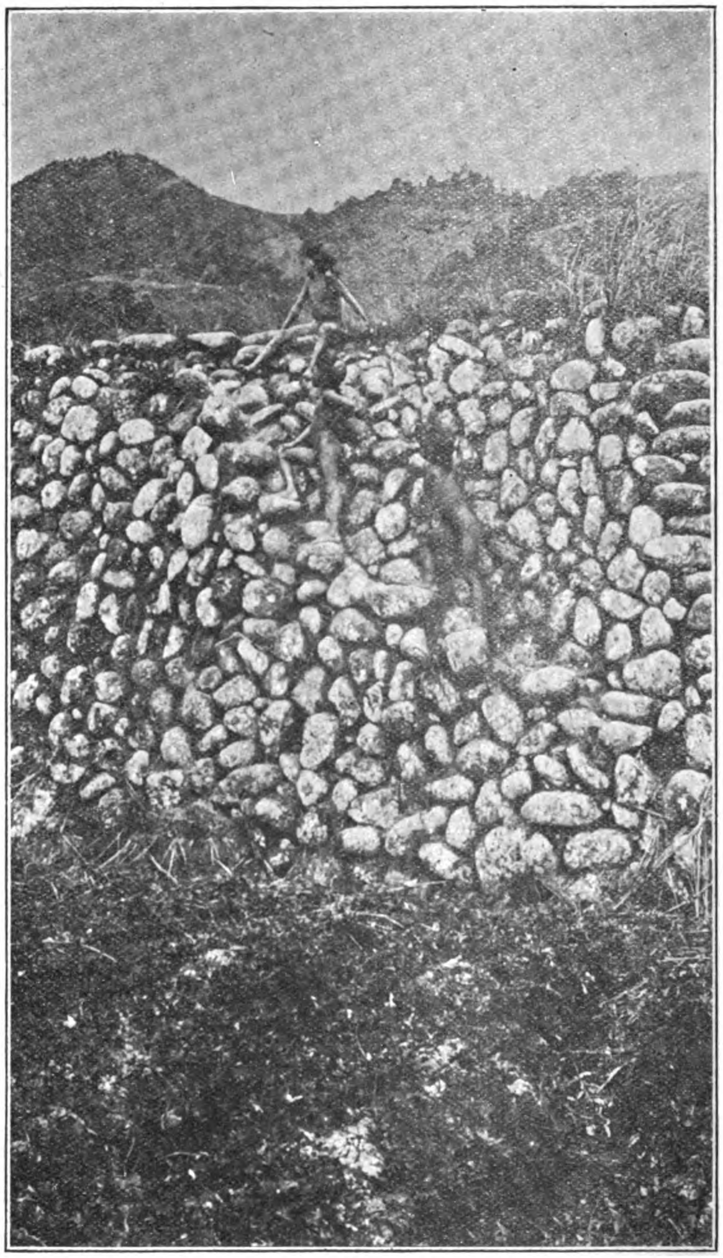
PASIG RIVER.—The existing project proposes to maintain by dredging an 18-ft. channel at mean low water across the bar up the river as far as the Bridge of Spain, and a 6-ft. channel through the upper river, at the lowest stage of Laguna de Bay.

* Month of June estimated.

EBLO, SHOWING SYSTEM OF RICE SEMENTERAS.



BONTOC IGOROTS.—BANAWI RICE SEMENTERAS.



BONTOC IGOROTS.—A TERRACE WALL.

At the time of American occupation there was about 12 ft. at mean low water on the bar and the channel was obstructed by a number of sunken vessels. This office received from the Spanish Government for use on the work 4 launches, 6 dump scows, 1 water boat and 1 barge, all of which were in bad condition and have had to be rebuilt.

To obtain and maintain the 18 ft. channel has required the dredging of 1,726,610 cub. yds. of material to the close of the last fiscal year. During the present fiscal year 478,705 cub. yds. have been dredged. For several years it was necessary to employ the entire plant on the work, but the channel can now be maintained by the use of one dredge.

The upper Pasig River is an important channel of commerce between Manila and the other towns located on its banks and on Laguna de Bay. According to Spanish reports there was originally a depth of but 12 to 15 in. at low water on bars obstructing the various outlets to the Laguna, and of only from 14 to 16 in. on bars further down stream.

The disturbing influence in the regimen of the river is the Mariquina River which empties into the Pasig at the town of Pasig and during floods brings down large quantities of sediment which is deposited not only in the lower river, but also in the Laguna itself and has created a delta formation in the lake similar to the one it has formed in Manila Bay.

Between 1886 and 1896 the Spanish authorities materially improved navigation by cutting a canal and rectifying the river for about half a mile above the mouth of the Mariquina, and by closing numerous side channels so as to make the branch of the river passing the town of Napindan the principal outlet to the lake.

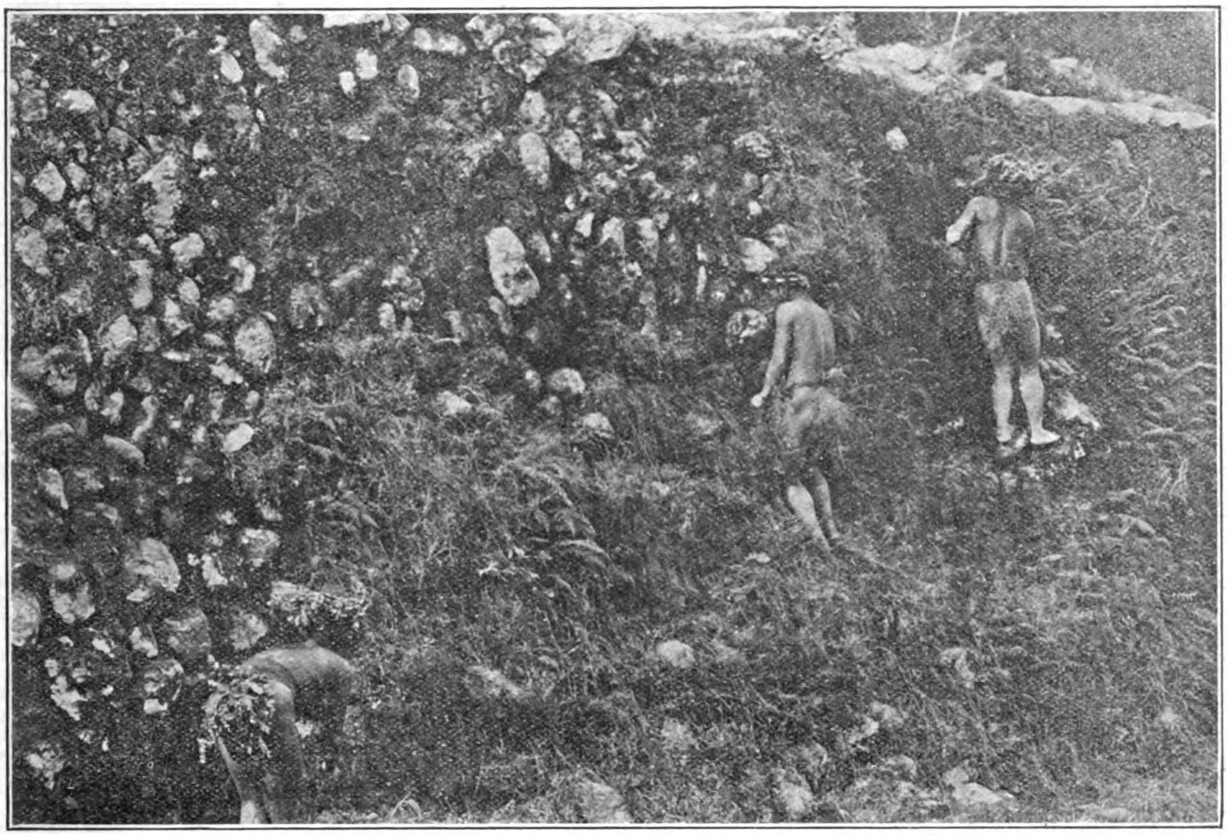
During the low water of 1900 there was a clear channel depth of 4 ft.

When this office took charge of the work the only dredges available for the upper Pasig were two Preistman and one bucket dredge of a capacity of from 80 to 100 cub. yds. each per day. A dipper dredge and a suction dredge have been constructed for the work, and during the fiscal year ending June 30, 1904, dredged 150,421 cub. yds., maintaining a channel of 5½ ft. depth at low water through the upper river.

During the present fiscal year 33,358 cub. yds. have been dredged for maintaining navigation, but the suction dredge has also been employed in pumping gravel from the river for the surfacing of the Santa Ana-Fort Wm. McKinley Road, the cost of which has been paid from the appropriation for roads and bridges. Below the mouth of the Mariquina River, the river has been contracted for a distance of about 2,000 ft. by the construction of wing walls and the shore revetted for a distance of 1232 ft. The wing walls were constructed of rip-rap obtained from the Fort Wm. McKinley reservation and the revetment consisted of a bamboo mat sunk with stone.

SANTA CRUZ ESTERO.—By Act No. 1114, 9,656.00 pesos was appropriated for dredging the Santa Cruz Estero, which was increased to $10,000.00 by resolution of the commission by allotment from funds appropriated for the transportation of the constabulary. The project provides for dredging a 4-ft. channel from the Pasig river to the constabulary storehouses, a distance of about 2700 ft. Work was begun in April, 1904, with a small Preistman dredge. At the close of the fiscal year about 2300 ft. of the channel had been excavated, 17,400 cub. yds. of material having been removed. A pavement of brick, stone and tile, which had gradually accumulated rendered the dredging difficult, as the Preistman dredge is not well adapted to removing such material. The narrowness of the estero and the small clearance under the bridges also delay operations, it being necessary at every bridge to dismantle the plant, to get under the obstruction, and then to reassemble it before renewing work.

The material excavated has been generally used to fill in the grounds around the buildings of the Bureau of Coast Guard Transportation on Engineer Island. At the current prices for earth fill the saving to the Bureau of Coast Guard and Transportation, by this fill, exceeds the cost to the constabulary for the excavation. While a large commerce in cascoes and bancas



BONTOC IGOROTS.—WOMEN WEEDING A TERRACE WALL AT SOIL-TURNING SEASON.

has already been benefited by this improvement, an extension of the work to the juncture with the Binondo Canal, a distance of about 900 ft., is extremely desirable. A further extension to Paseo Azcarraga would afford a cheap means for transportation to the heart of the city of products arriving on the Manila and Dagupan Railroad. By deepening the estero to Palumpang, connection would be made with the Bitas River, and with a large internal water system E. of Manila Bay. A considerable commerce at present seeks this channel though limited to transportation in bancas and rafts which can only be moved at high tide. As the business of the city is largely based on transportation by cascoes, the development of the esteros has an importance that would not exist in American towns.

REPAIRS TO PASIG RIVER WALLS.—The balance of P4,829.59 remaining at the close of the last fiscal year of the allotment by Act 885 for the repairs to Pasig River walls has been expended in pointing up the face of the wall, resetting coping stones that had become loose, and setting cannons for mooring posts. The section of wall near the Anda Monument which was damaged during the flood of July, 1904, was also repaired. The improvement of the Pasig River, of Santa Cruz Estero, and the repairs to the Pasig River walls, have been in local charge of Assistant Engineer James E. Ainsworth.

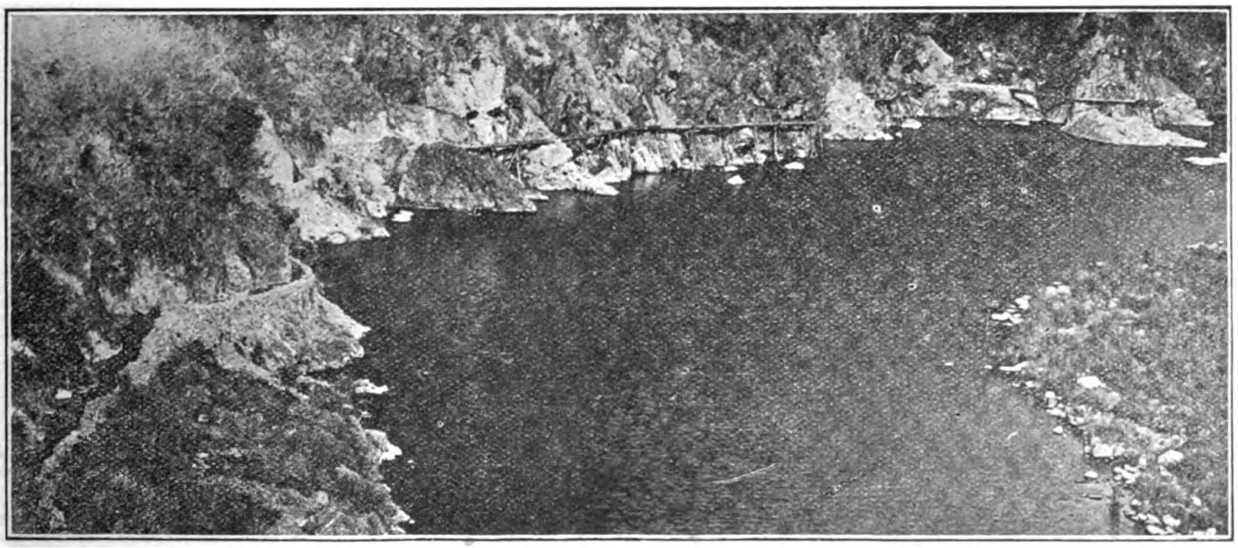
REVOLUTION IN CABLE CODES.

THE PANTELEGRAPHY CODE SYSTEM.

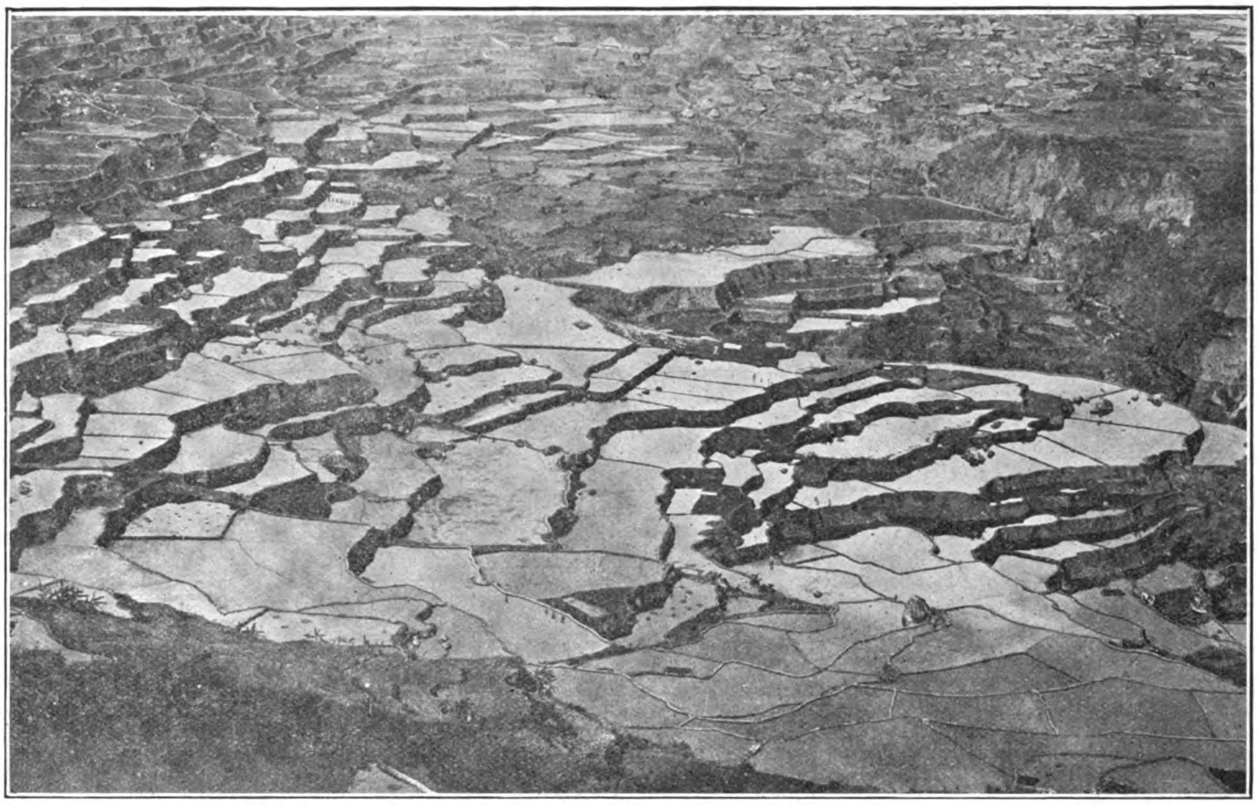
In these days of small margins anything that tends to minimize the working expenses of a business is worthy of consideration. In this connection the following particulars regarding the above code system will prove of interest:—

Pantelegraphy is the scientific application of the latest regulations issued by the International Telegraph Conference, i. e., that in the construction of codes any words may be used which are of artificial construction so long as they consist of not more than ten letters and are of pronounceable syllables.

COMBINATION PHRASE CODE VYBO.—Everyone has experienced the difficulty when working from the old phrase codes of finding a phrase to convey the exact meaning required—the phrases provided either expressing too much or too little. For instance, if one wishes to indicate doubt that his correspondent is correct, the old phrase codes provide nothing better than some bald statement as "You are wrong," whereas by pantelegraphy it would be just as easy to telegraph "Surely you must be mistaken." This difficulty is entirely overcome by the Combination Phrase Code VYBO. It provides for *every word* a specific group of letters so that any phrase desired can be immediately compressed into telegraphic form simply by writing down the letters representing the words of that phrase and cabling the



BONTOC IGOROTS.—IRRIGATION DITCH WHICH FEEDS TROUGHS SECURED TO MOUNTAIN SIDE SHOWN AT THE LEFT.



BONTOC IGOROTS.—RICE SEMENTERAS AT TRANSPLANTING SEASON.

result in words of ten letters. Actually VYBO is the entire dictionary codified in a very handy, simple, and economical manner. It is possible by this code to telegraph any phrases or names entirely in the code. For example this article could be easily transmitted word for word wholly in code.

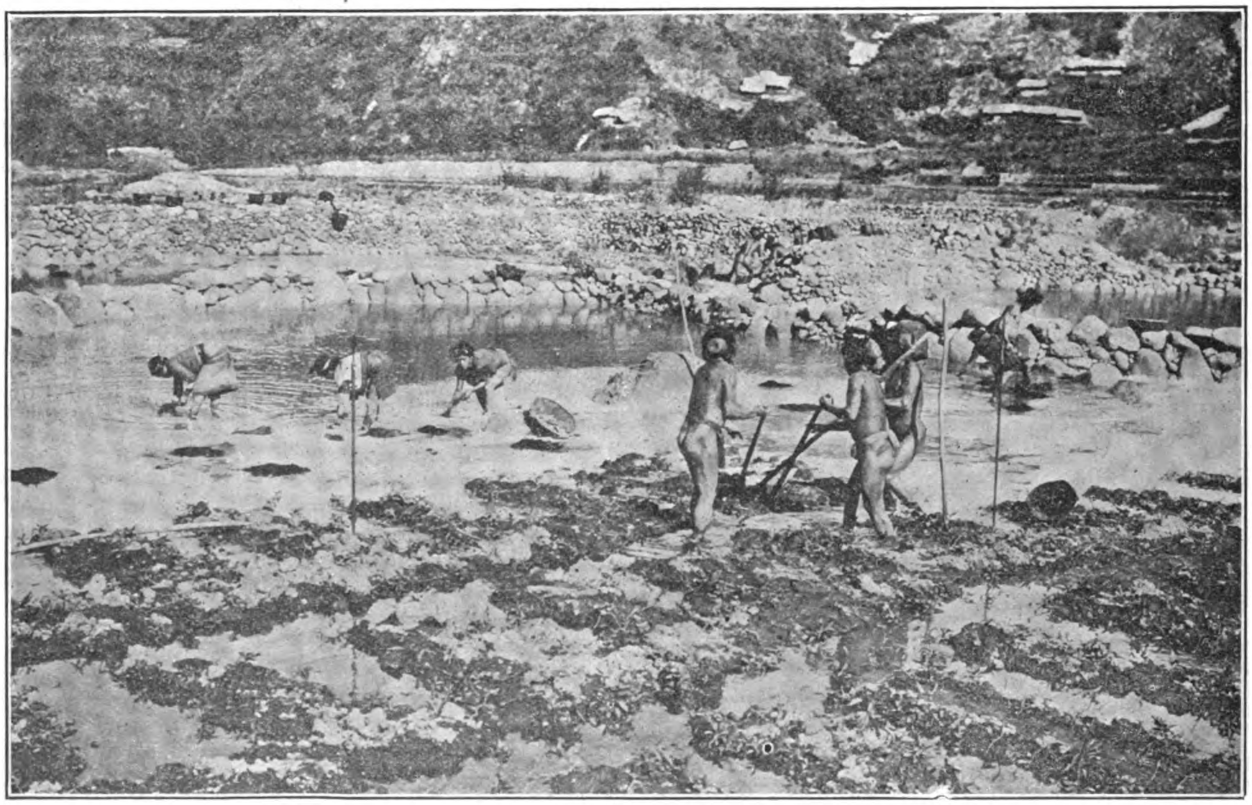
PANTELEGRAPHY TRANSLATING CARD.—This portion of the system is intended for application to the old figure and phrase codes. By its use it is possible to wire any *two words* from such codes as the A. 1., A. B. C., Western Union, Whitelaw's 400,000, etc., as *one word* —an immediate saving of 50 per cent.

The Pantelegraphy Translating Card provides two sets each of ten thousand million (10,000,-000,000) perfectly pronounceable and euphonious words, which renders it the equivalent of a *double ten figure code*.

When applied to figure codes any *ten figures*, or two groups of five figures, can be telegraphed in *one word*, any five groups of six figures as three words and so on.

It is worthy of note that the committee of the London Lloyds has just decided to furnish all their principal agents throughout the world with copies of the Pantelegraphy Combination Phrase Code, and that in future all ships mentioned in "*Lloyds' Weekly Shipping Index*," and similar publications, will be prefaced by a pantelegraphy code cypher for the convenience of users of this system—a striking testimony to the merits of the system.

Further particulars of this unique time and money saver can be obtained from the Pantelegraphy Publishing Company, Ltd., British post office box 170, Shanghai, or 20 Copthall Avenue, London.



BONTOC IGOROTS.—TURNING SOIL IN A WATER-FILLED SEMENTERA, SHOWING WOMEN TRANSPLANTING RICE.

FAR EASTERN ENGINEERING AND CONSTRUCTION NEWS

RAILWAYS, SUPPLIES, ETC.

F. M. S. RAILWAY LOCOMOTIVES—The Federated Malay States Railway has, as a part of its equipment, sixty-three serviceable locomotives.

MAINTENANCE OF WAY, MADRAS RAILWAY.—The cost of maintaining a mile of single track, including sidings, on the Madras Railway for six months is about Rs. 961.16.

HANKOW-CANTON LINE.—There is a report afloat on the China Coast to the effect that on the payment of Tls. 7,000 000 the Hankow-Canton Railway may be restored to the Chinese.

FRENCH CONCESSION, KWANGSI PROVINCE, CHINA — France is now endeavoring to secure a concession for the building of a railway in Kwangsi Province, from Lung-chow to Kwei-lin *via* Liu-chow. The British Minister to China is said to be opposing the concession.

STRETINSK-HABAROVSK LINE.—The Russian Government is reported to intend laying a line of railway from Stretinsk to Habarovsk along the Amur, as originally planned, for which the easier line through Manchuria was afterwards substituted.

MALACCA RAILWAY, S. S.—It is understood that the Legislative Council of the Straits Settlements has approved of the transfer to the Government of the Federated Malay States of the Malacca-Pulau-Sebang Railway on payment by the government of the capital cost of the construction.

YOKOHAMA-HACCHIOJI EXTENSION —The directors of this Japanese railway have decided to extend the line from the Keihin Station at Kanagawa to the foreshore at that place by building the railway on the reclaimed land there. Car shops, factories and the main office of the company will also be constructed at the end of the extension.

PERAK (F. M. S.) RAILWAYS.—The length of open line from Prai in Province Wellesley to Tanjong Malim, on the Selangor border, and of the short line from Taping to Port Weld, gives a total mileage of railways in this state of 213, with forty-four stations opened to traffic. The capital account of the railways exceeds $19,000,000 and the addition thereto in 1904 was $250.000. Receipts amounted to $2,057,000. The line is well maintained.

RAILWAYS OF JAPAN, 1904.—At various times in 1904 the ordinary railway traffic suffered from movements of troops, but the railways themselves profited, and they show increased earnings for the period under review. Two hundred and fifty-eight miles of railway were opened to traffic during the year, as compared with 211 miles in 1903, the total mileage now being 4,491 miles, of which government lines account for 1,345 miles.—*British Consular Report.*

SEOUL-FUSAN RAILWAY.—The Seoul-Fusan Railway Company, which was compelled to erect the Fusan station at Tsuanriong owing to the British Consulate point being midway between that place and a convenient point in the Port of Fusan, has reached a satisfactory understanding with the British authorities. The company will remove the British Government building to another site at its own expense and extend the railway as far as a certain place selected for that purpose, facing Fusan Harbor.

AMERICAN FREIGHT CARS, JAPAN.—An order has just been closed with the American Car and Foundry Company for 1,000 freight cars for the Japanese Government. The cars are to be of the gondola type, with steel underframes and with a capacity of 20 tons. It is understood that the order was divided equally between the Japanese Government purchasing agents, Messrs. Mitsui & Co , and Messrs. Okura & Co. Shipment is to be made as early as the order can be filled.

RAILWAY EXTENSION, NEGRI SEMBILAN, F. M. S.—A survey of a possible extension of the railway system of this state has been made from a point on the Gemas River near Bukit Bantan, following along the South bank of the Muar River past Batu Bersawah where it crosses to the North bank of the Muar, past Kuala Jempol, and on through the Serting District, probably to be continued thence through the undeveloped and, except for aborigines, as yet uninhabited portion of the state near Pasoh, to, it is believed, Kuala Semantan in Pahang.

LOCOMOTIVES FOR JAPAN.—The principal features noticeable in the trade in locomotives (1904) are a large increase in imports from the United Kingdom, a corresponding decrease from the United States and a big jump in the imports from Germany. It is interesting to note that during the past year the British type of locomotive obtained the preference, and that all the German locomotives and many of those from America recently imported or still on order are of British type and standards. So far as price goes, the three countries seem to compete on about equal terms. Germany now requires the longest time for manufacture, while there has been little to choose between the United Kingdom and the United States in this particular.—*British Consular Report.*

NEGRI SEMBILAN (F. M. S.) RAILWAYS —The total length of this line, which has already been surveyed, from Seremban to the Negri Sembilan border at the Gemas River, is 63 miles. The progress on earthwork shows that out of a total of 4,294,432 cubic yards in the whole length of the line, 3,083,000 had been completed and excavated by the end of the fiscal year, of which 2,421,965 were during 1905. Out of a total of 300 bridges and culverts, 191 have been completed and 52 more are in progress. Nineteen miles of permanent way were linked in, and at the end of December 1904 all sleepers necessary for the line as far as Tampin—about 96,000 in number—have been delivered from the forests of Negri Sembilan. Level crossings and road deviations have been completed up to the 50th mile. The telegraph has been completed up to Tampin and is in progress of erection up to the 46th mile. All stations and buildings have been completed up to Tampin and are in progress along the remainder of the line.

FEDERATED MALAY STATES RAILWAYS —The total expenditure on construction and survey of new lines including $90,330 for the Johore line, amounted in 1904 to $2,898,949, all of which was met by surplus revenue funds. If to this be added the sums expended on the Malacca-Pulau Sebang Railway and the extension to Singapore, both of which are being carried out by the Federated Malay States Railway Department on behalf of the colony, the total expenditure on construction amounted to $3,844,119—to which, perhaps, should also be added the expenditure on the new central workshops, new central offices, and other special services, making a gross total of $4,897,081. The extensions in hand during the year were the Negri Sembilan extension from Seremban towards Malacca, now completed to Tampin; the Batu Caves, extension, the object of which is stated to be the transport of ballast to the main line and which also joins up the new central workshop with Kuala Lumpur; the survey from the Gemas River on the borders of Pahang to Kuala Semantan, 72 miles, of which 19 miles of field work and 15 miles of plans and sections were practically completed by the end of the year, and the Johore extension, about 120 miles, the survey of which began early in the year and preparations for construction started at the end of the year. The survey was completed and good progress made with the construction of the Malacca-Pulau-Sebang line, 21 miles, which will be finished in the course of the year.

ELECTRIC LIGHTING, TRACTION, POWER, ETC.

TOKYO ELECTRIC RAILWAY EXTENSION.—The line of this corporation has just been extended from Ochanomizu to Manseibashi.

TRACTION, HONGKONG.—It is proposed to use a gas-producer power plant for the operation of the new Peak Tramway at Hongkong.

BANGKOK ELECTRIC CAR SERVICE.—The new electric cars for the Bangkok (Siam) lines, have been tested with success, the power being supplied for the nonce from the plant of the Siam Electricity Company. The tramway company is issuing Tcs. 200,000 of share warrants and debentures.

ORIENTAL TELEPHONE AND ELECTRIC COMPANY —This concern will authorize the creation of debenture stock to the amount of £200,000 to provide for the reconstruction and extension of the installations, to comply with the requirements of the Governments of India, the Straits Settlements and Hongkong.

LARGE CONTRACTORS FOR JAPAN.—Contracts amounting to fully $5,000,000 gold, calling for the shipment with all despatch, of electrical equipment, machines and tools, have been placed in the American market on Japanese account. The orders are mostly closed by the New York representatives of Japanese firms. The machinery is for installation in the principal government shipbuilding yards and arsenals.

AERIAL ROPEWAY, HONGKONG —An aerial ropeway is being constructed by the military authorities at Hongkong for the purpose of conveying ammunition, etc., from the landing wharf in the harbor to the magazines on the hill. The tresties are of iron lattice columns in concrete foundations and the car sits load about two tons. It is intended to continue the line up to the new military hospital at an early date. A similar ropeway is in active operation at the dairy farm on the S. side of the island, transporting loads from the sea level up to the farm at Pok-fo-lum.

HONGKONG ELECTRIC COMPANY LTD.—The manager of this company reports that on June 1st. last, the number of lamps, fans motors connected to the concern's supply service was equivalent to upwards of 34,500 lamps of 8 c. p. Eighty-five arc lamps are maintained and 15 electric lifts are being operated by the power service. During the year a 250-kw. steam alternator was erected at the company's works, and an improved motor generator has been fitted for use in connection with the power service. A new chimney is now in course of construction at the works.

ELECTRIC LIGHTING, CANTON, CHINA.—Messrs. Shewan, Tomes & Co., of Hongkong have entered into an agreement with the taotai of Canton whereby it shall enjoy an electric lighting monopoly of the city for a term of years. The company shall illuminate the yamens of the viceroy and governor at half price and other yamens and government colleges shall be charged two-thirds of the original price. On the first five days of every year and on the occasion of the anniversary of the birthdays of their majesties, the Empress-Dowager, and Emperor and Empress Hwong Hsu, the company shall supply 200 lights free of charge. At the expiration of the present term, it shall be at the option of the firm as to renewal or otherwise of the agreement.

MESSRS. GERMANN & CO., LTD., MANILA, P. I.—This enterprising firm has recently again enlarged the premises of its engineering department. A splendid large separate sales and exposition room has been added to the mechanical and electrical shop, Escolta No. 100, rear building, which has already been found too small to attend to all the orders in a prompt and efficient manner. The very complete assortment of all classes of electrical apparatus, machineries and fixtures, always stocked, enables this firm to accept any contracts of any kind of electrical and mechanical works; also to attend to every sort of repairs in this line of business. Owing to the great variety of their goods in stock, Messrs. Germann & Co. were the only people of this branch to accept recently a very important repair contract for the whole electric installation on board the Imperial Russian ships *Oleg* and *Zemtchug*, now lying in Manila Harbor, which work will be completed in forty-five days from the date of the contract.

WATERWORKS AND IRRIGATION

JAPANESE PLANT AT YINGKOW.—The Japanese residents of this city have decided to construct a waterworks system at Yingkow. The water is to be brought from the upper reaches of the Liao River, and the works will be large enough to supply 60,000 persons.

KRIAN (F. M. S.) IRRIGATION.—In regard to the Krian irrigation works estimated to cost $1,600,000, progress in 1904, though disappointing on account of deficiency in the labor supply, was satisfactory insofar that it included laying pipes for the syphon crossing of Kurna River, a difficult operation; completion of banks from the intake to this point (about 3 ½ miles) for the greater portion of which it was necessary to transport material by trucks and locomotives; completion of the spill weir and closing of the Merah River channel, and completion of the Tanjong Piandang, Titi Serong and Alor Pongsu channels, and of the regulators at Bagan Serai and head of the Selinsing branch canal.

SEREMBAN (F. M. S.) WATER SUPPLY.—This scheme, which has been roughly estimated to cost $175,000, is reported to be well under way. Seven-in. wrought-iron spirally-riveted pipes are to be used, and the first shipment has arrived in Singapore. A retaining reservoir is to be constructed 7 ¼ miles from the service reservoir on Gun Hill in Seremban, on the slopes of Gunong Angsi, where possibly a storage reservoir may also be required. The survey for the system has been practically completed and the scheme is to bring the water from Sungei Simin, rising on the slopes of Gunong Angsi, in 7-in. pipes to a service reservoir on Gun Hill, from which water can be supplied to the consumers by gravitation.

BUILDINGS.

BANK OF JAPAN, HIROSHIMA.—The building for the Hiroshima Agency of the Bank of Japan, now in course of construction, has been thrown open to business. Mr. Bunzaburo Watanabe is manager of the new agency.

BUILDING OPERATIONS, STRAITS SETTLEMENTS —According to a Singapore paper building operations are going on steadily in the Straits Settlements, North and South. In Singapore most of the hotels are in splints and new wings are being added. In the suburbs it is next to impossible to rent a decent house and these are regarded signs of prosperity. Mr. Towkay Loke Yew, a wealthy resident, has introduced an up-to-date office building known as Winchester House. It is located on Collyer Quay, is on London lines, contains several dozen offices, and is to be fitted with electric light and the first elevator seen in Singapore.

CHIEF COURT BUILDINGS, RANGOON.—The Public Works Department of Burma is advertising for tenders for the construction of the whole of the new Chief Court Buildings at Rangoon. Bids will be opened at the office of the Executive Engineer, Construction Division, Rangoon, September 4th. The estimated cost of the buildings is Rs. 13,07,636. Particulars of the estimates:—Main Chief Court building, including sanitary works, Rs. 11,75,736; stable and carriage shed with peons' and durwans' quarters. Rs. 28,138; refreshment room for natives with married and single men's quarters, Rs. 21,619; lean-to roof of native refreshment room, Rs. 2,808; stable and carriage shed with European refreshment room, Rs. 9,425; latrine, bathing shed, official assignee and bailiff's auction room warehouse, sweepers' quarters, sanitary appliances (for 2-9) quarters, cast iron railings, gates, roads, culverts and wooden fencing making up the balance.

BRIDGES.

MAIZURU RAILWAY, JAPAN.—The temporary bridges and embankments in this line, which had been constructed in haste are being replaced by substantial structures. The improvement will be finished by the end of the present year.

BINONDO (MANILA, P. I.) LIFT BRIDGE.—The whole material for this structure, consigned to Messrs Germann & Co., Ltd., Manila, has arrived and been discharged, but the immediate erection with which the firm intended to proceed at once is necessarily to be delayed owing to the city not having prepared the foundations in due time.

PUBLIC WORKS.

FEDERATED MALAY STATES IMPROVEMENTS.—The magnitude of some of the improvements in the hands of the Public Works Department may be judged from the following list:—Krian irrigation, $1,600,000; Negri Sembilan-Pahang trunk road, $1,235,400; Kuala Lumpur electric light, $880,000; Guides cantonments, $225,000; Seremban waterworks, $175,000, town hall at

Kuala Lumpur, $100,000; postoffice building at Kuala Lumpur, $100,000; central school, $98,000; Kampar waterworks, $75,000; Selangor museum, $50,000; astana at Sri Menanti, $15,000.

PERAK (F. M. S.) PUBLIC WORKS.—The gross expenditure on public works in this state during 1904, according to the resident's annual report just issued, was $2,179,000. These works were carried out by a staff the sum total of whose personal emoluments amounted to $108,000, which bears a relation of about 5 per cent to the expenditure. The annually recurrent works cost $727,000, while the new works undertaken, and wholly or partly executed, came to $1,250,000. Excellent progress was made with the Krian irrigation works on which $214,000 were expended. The largest building was the central school at Taiping. The cantonments of the Malay States Guides were vigorously pushed forward and the whole regiment, with the exception of one company at Penang, is now quartered in Taiping.

PORT WORKS, DREDGING, DOCKS, ETC.

MAIZURU, HARBOR, JAPAN.—The harbor improvements now under way at this port will be finished by the end of the current year.

DOCK EXTENSION, FOOCHOW.—The Wai Wu Pu at Peking has agreed to a foreign loan of Tls. 3,000,000 for the extension of the Foochow dockyard.

DOCKING CONSTRUCTION, JAPAN.—Docking construction is active in Japan. Two new dry docks are to be constructed at Moji, one 480 ft. and the other 600 ft. in length. The big floating dock built at Nagasaki for Kobe has been successfully tested by docking the *Fukura-maru*.

"DREDGER" AT SHANGHAI.—The Dutch dredger, *Dredger*, arrived recently at Shanghai from Flushing, Holland, Singapore being her last port of call. She is a suction dredger working on what is said to be an entirely new principle, and it is claimed she can pump more than two of the ordinary dredgers new in use. If the dredger comes up to expectations she will be taken over by Messrs Butterfield & Swire, who will use her in dredging at their Pootung wharves, or wherever she may be required. She had a most successful trip from Holland, being 108 days on the voyage, out of which she was three weeks at Port Said.

SINGAPORE HARBOR IMPROVEMENTS.—Several months ago THE FAR EASTERN REVIEW published the plans and report of Messrs. Coode, Son & Matthews on the proposed improvement of Singapore Harbor. Now these same engineers come forward with another report in reply to criticisms on their design for the works. In this they state that the advantages which appear to them as being claimable following up the construction of the proposed works are as follows: —(1.) The inner road and those portions of the harbor which are adjacent to the shore, would be sheltered at all times and under all conditions of wind and weather —(2.) The necessity for the construction of an independent boat harbor would be removed. —(3.) The transfer of the traffic, due to the berthage of inter-colonial steamers at a sheltered quay, such as that proposed at Telok Ayer, would greatly relieve the congested condition of the river.—(4.) The erection of godowns on the new reclamation, especially arranged to meet the altered conditions of traffic, and in close proximity to the steamers, would considerably facilitate the handling of cargoes —(5.) The proposed quay would be connected with the railway system of the island and also with Tanjong Pagar —(6.) Ample accommodation would be provided to meet present requirements, and means afforded for extension hereafter if desired, either by further deepening the sheltered area by dredging, or by forming additional berthage by jetties or further quayage.—(7.) Before improvement works at Kalang Basin, such as described in our former report, could be carried out, similar shelter to that contemplated by the proposed works would be necessary. The Kalang Basin improvements could therefore be undertaken hereafter, without futher cost on sheltering works, when it is considered that the time has arrived for the execution of the same. A further advantage to which we have referred herein may be claimed, as to the shelter afforded to Singapore River and to the traffic carried on between craft lying in the roads and Kalang Basin.

MINES AND MINING.

COPPER OUTPUT, JAPAN.—Japan's output of copper in 1904 was 34,850 tons as against 31,360 tons in 1903.

NEGRI SEMBILAN (F. M. S.) MINING.—At Membau, below Rasah on the Linggi River, an important mining camp has sprung up.

MACHIDA COAL MINE FLOODED.—The Machida coal mine, Japan, owned by the Iwaki Colliery Company, has become flooded, owing to a sudden inrush of water, and work has been partially suspended for the time being

MINING LANDS, F. M. S.—The total area of mining land held under alienation in the Federated Malay States, is roughly, 219 000 acres, exclusive of Pahang. The total area is about 229,000 acres. The amont of land alienated during 1904 was 29,891 acres.

BUA MINING COMPANY, LTD., BAGUIO, BENGUET, P. I.—Mr. Leonard Lehlbach, mining engineer, manager of the Bua Mining Company, Ltd., is pushing work of this Company's Benguet (Luzon) property, and THE FAR EASTERN REVIEW hopes to give a more detailed account of this company's property at an early date.

SELANGOR (F. M. S.) MINES.—Between Rawang and Serendah a new mining station has been opened. In the Kuala Lumpur District deep mines are being opened up on the old worked-out shallow fields, and modern plants are being erected. At Kajang, a field for long more or less dispised, three rich mines have been opened up.

MINES IN MONGOLIA.—The Peking Government has decided to despatch officials to Mongolia to study the mines there and report upon same in an effort to interest native gentry to undertake their operation. Those mines which have been privately sold to foreigners will be confiscated by the government and those who sold the ground without authority will be severely punished.

PAHANG (F. M. S.) TIN MINES.—The Pahang Administration Report for 1904, just issued, shows that the Kuantan mining district is making great strides and the mines opening up in the Blat promise to become important. They exported 4,384 piculs of alluvial tin during the year. The Pahang Corporation exported 4,921 piculs of lode tin, and the Pahang Kabang 1,782 piculs. There are twenty-six lodes on the holdings of the Pahang Corporation and Pahang Kabang.

PHOSPHORUS DEPOSIT, JAPAN.—A rich deposit of phosphorus has been discovered at Hannoura, Nanao Bay, Noto Province, Japan, and a merchant of Osaka has obtained a concession covering 3,000,000 *tsubo*. The deposit extends under the sea in a layer of 30 ft., and the ore contains 60 per cent of the mineral. The concessionaire intends to establish a factory at Nanao for manufacturing manure from the phosphorus.

NEW GOLD MINING COMPANY, JAPAN.—A new gold mining company named the Hakko Kinzan Kaisha has been organized in Yokohama by Messrs. Taisuke Miura, Sakuhei Iwata, and others, with a capital of -Y-500,000. The company intends to work an extensive mine and diggings in Hakko-zan, a mountain range of Fukushima Perfecture. In the experimental boring, 20, or 30 mommée of gold have been daily obtained.

PERAK (F. M. S.) TIN OUTPUT.—Perak continues the premier producer of tin in the Federated Malay States, according to the annual report of the senior warden, Mr. Dykes. The mines at Tronoh and Tambun still continue their prosperous career, and further development of the deposits at these mines has justified the managers in employing further labor-saving machinery. At Papan fine machinery has been erected by the Pusing Lama Company, and on the adjoining block Mr. Osborne is about to erect a fine new modern plant. The hydraulic companies around Gopeng still continue to do well.

KOLAR GOLD FIELDS, INDIA.—Following are the returns for the month of June, 1905: Balaghat.—3.950 tons of quartz crushed yielded 3,157 oz. and 2.750 tons of Tailings cyanided yielded 269 oz., making a total of 3,426 oz. of gold as compared with 3,402 oz. in May. Champion Reef.—Milled 19,150 tons which produced 15 799 oz., 13,494 tons of Tailings treated by the cyanide process produced 1,902 oz., and scalings from No. 2 mill plates 691 oz., making a total of 18.410 oz of gold, as compared with 18,101 oz. in May. Hutti (Nizam's) —1,164 oz of gold from 2,050 tons of quartz crushed. Mysore.—16,250 tons of quartz crushed produced 15,367 oz., and 13,653 tons of tailings cyanided yielded 1,684 oz., making a total production of 17,051 oz. of gold as compared with 16,976 oz. in May. Mysore West.—Mill ran 674 hours, crushed 2,295 tons which yielded 1,027 oz. of bar gold. Nandydroog.—6,6 0 tons of quartz crushed yielded 5,536 oz. and 7,020 tons of tailings treated by the cyanide process yielded 618 oz., making a total of 6,154 oz. of gold, as compared with 612 oz. in May. Ooregum.—Stuff crushed 10,011 tons gold produced 4,338 oz and slimes and tailings cyanided 10,201 tons gold produced 1,147 oz., making a total return of 5,485 oz., as compared with 5,483 oz. in May.

PAHANG (F. M. S.) GOLD OUTPUT.—The export of gold from Pahang in 1904, according to the administration report just issued, was 18,004 oz. as compared with 12,411 oz. in 1903, an increase of 5,593 oz. Of this quantity 3118 oz. really belonged to 1903, but the duty was only paid in 1904. The following table shows the output from the principal mines:—

Mine.	Tons crushed.	Ounces gold	Average yield dwts.
Raub Company........	37,472	7,197	3.84
Malaysian Co	10,829	3,669	6.77
Kechau Gold Mining Syndicate	2,053	569	5.50
Kechau Gold Fields....	2,212	909	8 15
Penjum	2,395	281	2.34
Total.	54,961	12,625	4 57

In addition to this, 136 oz. of alluvial gold were washed out of the tin in Bentong; 10 oz. were exported as the result of prospecting done by the Tokkai Syndicate; 2,115 oz. were won from 11,350 tons of sands by the Selensing Company by the cyanide process. The royalty on the year's output, including that paid on 3,118 oz. exported last year, was $25,426; $475 was paid as commuted royalty by alluvial workers in the Lipis district. The labor force employed in the gold mines is about 900 coolies, besides a few Malays working alluvial ground. Labor-saving machinery of 969 h. p., equivalent to a labor force of 7,680 men, is also employed. At the end of 1904, 77,000 acres of mining land were held under permanent titles in the state; this was increased to 79,440 acres at the end of year under review. These figures do not include the unascertained area of the Liang Concession; nor do they include the concessions of the Pahang Corporation and of Towkay Loke Yew, both in the Kuantan District. One of the large concessions, that for 50 sq. m. at Penjum, was cancelled in September, owing to non-compliance by the lessees with the conditions of their lease. Theft of gold from the mines still continues, but not to any great extent, and ten cases were disposed of by the magistrates during the year, four at Raub and six at Lipis.

F. M. S. GOLD MINING.—The total value of gold exported from the Federated Malay States in 1904, according to a report just issued, amounted to about £80,600, the quantity being 15,157 oz. The quantities obtained from the actual crushings were as follows. —Pahang, tons crushed 54,961 with output of 12,625 oz.; Negri Sembilan, tons crushed 3,438 with output of 2,189 oz. Total, tons crushed 58,399, gold obtained 14,814 oz. In addition to this amount 146 oz. were won from alluvial workings and 2,115 oz. from 11,350 tons of tailings by the cyanide process. The output from the chief mines in Pahang and Negri Sembilan was as follows:

	Tons crushed	Ounces.
Raub Australian.....	37,472	7,197
Malaysian Company	10,820	3,664
Kechau Syndicate...............	2,053	569
Kechau Gold Fields.............	2,212	909
Penjom	2,395	281
Batu Bersawth..................	3,438	2,189
Total.........	58,399	14,814

AUSTRALIAN RAUB GOLD MINING PROPERTY, F. M. S.—The annual report of the directors of the Australian Raub Gold Mining company, Ltd., shows that during the year ended March 31st, 1905, the concern only succeeded in keeping its "head above water." Returns deminished perceptibly from the previous year's average of 5 dwt., and while the future looks quite clear with the innovation of the tailings treatment of the ore, economy must be the watchword. However, there is a large quantity of surface and shallow ground which can be profitably worked. *Labor*—This feature of the mining operations during the period under consideration was satisfactory—plentiful, healthy, thriving, industrious and contented. The coolies worked very cheap. *Timber and Firewood.*—The company still has abundant supplies of both the hard and soft building woods, mine poles and slabs, and firewood, within the limits of the concession. Its average monthly consumption of mine timber costs $500, and lately it has been using four or five times that amount for new construction work. The firewood bill has been reduced from over $2,000 per month to between $250 and $300 since the extended application of electric power, and it will be futher curtailed when the new plant is finished. *Power.*—What has been said in the foregoing emphasizes the value of the company's water power and electric transmission plant at Sempam. The average monthly cost of generating and transmitting electric current, including salaries, wages, and stores, but not depreciation, has been about $1,300. The effective h. p. employed (including lighting) has been gradually increased during the year from 100 to 200, and soon there will be an additional 50 h. p. in use. At 200 h. p. the cost per month works out at about 86½ or 87 per h. p., per annum, which is much the same as the lowest figures in Europe. *New Main Shaft, Bukit Koman.*—One of the considerations which led up to this scheme was a desire on the part of the government to test whether payable gold could be found at depths much exceeding those in which all previous gold mining in the Federated Malay States had invariably. This led to the Pahang Government contributing to the cost and stipulating that the shaft should be sunk to 1,500 ft. When it began to look as if at 440 ft. little or no paying stone would be encountered, work on the new shaft was suspended. *Plant and Machinery.*—The installation of new plant and machinery again made great inroads on the company's capital during the year principally in connection with the extension of the electric motive power and the cyanidation of tailings. At Sempam a new turbine and generator capable of delivering 300 h. p. at the mine has been added. At Bukit Koman the new electric hoist is in operation, and during the year the electrically driven Cornish pump, the first and only of its kind in the whole world, was put to work and is running beautifully without a moment's stop. It makes a saving of a least $1,000 per month in fuel. To enable ore-rasing to be confined within certain hours, and thus admit of all the other work ofthe mine being done through the one shaft, automatically tipping skips have been substituted for the old cage and truch system. The electric cable was also carried down the shaft, thus giving continuous and abundant light at all stations.

Pahang.—The Raub Australian Company's Bukit Koman shaft is now down to 455 ft. and the bottom levels have been driven at 440 ft. The stone at this level carries very little gold however. An arrangement was entered into with the Government by this company for sinking a deep shaft to 1,500 ft. The company has, since driving on the 440 ft. level at Bukit Koman, come to the conclusion that it is inadvisable to incur any further expenditure on sinking this joint shaft. The Malaysian Company's mine at Bukit Malacca was taken over by Raub Australian Company during the year. On this property the Malaysian Company had sunk a new shaft to a depth of 150 ft. This company started to work alluvian gold at Sepan, near Budu, and laid down a fine hydraulic installation. The results of its operations were most unsatisfactory, and it has since stopped work and removed its plant. The Selinsing Company has done no work on its land, with the exception of treating tailings. These are now finished and no work at all is being done. The Penjom Company stopped work entirely during the year and its concession has reverted to the state. Kechau Gold Fields and the Kechau Syndicate towards the close of the year decided to amalgamate, and these properties will be worked by the Kechau Gold Fields. The number of laborers employed by all the companies at the mines was roughly 900. *Negri Sembilan.*—The Batu Bersawah Company has sunk a new main shaft to 156 ft. and further sinking will be proceeded with when the new machinery is erected. The company during the year worked under considerable difficulties owing to the fact that it was unable to keep the old shaft dry and at the same time wind stone. The year 1905 will see a great step in the further development of this property and from past results the prospects are hopeful. The labor force employed is about 250.

--*General*--With the exception of a few ounces of alluvial gold from Perak, that state and Selangor are non-producers. The year under review, as far as Pahang is concerned, is the gloomiest one for years. The Government has done its best to assist the industry as far as possible. Kechau Gold Fields with Government assistance is developing two lodes and erecting machinery with a view to exploitation at the deeper level.

SHIPBUILDING, MARINE, ETC.

SS. "CHEANG CHEW."—This steamer has been sold to a German firm of Singapore.

STEAMER "KIAN ANN."—The steamer *Kian Ann* has been sold at Singapore by Messrs. Powell and Co., to Wee Bin and Co. for $15,000.

SALE OF STEAMSHIP "SULTANA."—The British steamer *Sultana* has been sold at public auction by Messrs. Powell and Co., Singapore, for $12,500.

SIAMESE STEAMER "MEDUSA."--This vessel has been sold to Japanese owners for $75,000 and handed over in Kobe. For many years she was in the Bangkok-Singapore trade.

"CHING PING" UNDERGOING REPAIRS.—The Chinese Engineering and Mining company's steamer *Ching Ping*, is undergoing extensive repairs at the Kiangnan Arsenal Dock.

"ELLEN RICKMERS" SOLD.—Rickmers have sold their steamer *Ellen-Rickmers* to the Hamburg-America Line. She has been renamed the *Liberia*, and is about due in the Far East.

STEAMER "YUENWO" REPAIRS.—Messrs. S. C. Farnham, Boyd & Co., Ltd., are the successful tenderers for the steamer *Yuenwo*, which was recently burned on the Yangtsze and towed down to Shanghai.

"IKI-MARU" LAUNCHED.—The steamer *Iki-maru*, 1,500 tons, built for the Sanyo Railway Company to run between Japan and Fusan, has been launched at the Mitsu Bishi Dockyards, Nagasaki. She is of 1,800 h. p.

STEAMER "KENILWORTH" DOCKED.—The steamer *Kenilworth*, from Manila, has been put on the docks at Kowloon to undergo extensive repairs, after the completion of which she will sail for Australia.

"ROHILLA-MARU" SINKS.—The steamer *Rohilla-maru*, owned by the Oshiro Steamship Company of Tokyo, struck a sunken rock at Nasamiseto, near Idzukushima recently, and when the crew left the vessel it was making water rapidly.

SUCCESSFUL TRIAL TRIP.—The river steamer *Tafoo-maru*, formerly the *Tahung-maru*, which has been reconstructed by Messrs. S. C. Farnham, Boyd & Co., Limited, Shanghai, for the owners, the Osaka Shosen Kaisha, recently has a most successful trial trip.

NOVEL AIR-COMPRESSING PLANT.—A large air-compressing plant has been sent from Hongkong to the wreck of the French cruiser *Sully*. It is intended to drill the rock which protrudes through the ship's bottom so as to enable the vessel to be lifted clear by means of the pontoon already on the spot. Much interest is being evinced in this most important salvage attempt of recent years.

MISCELLANEOUS.

NEW CANAL FOR JAPAN.--A canal is to be dug between Nagoya and Atsuta, Japan.

SPINNING MILLS, JAPAN.—Like those in China, the spinning mills in Japan have had a good half-year.

CABLE RATES TO JAPAN.—The Pacific Commercial Cable Company announces a reduction of 20 cents per word in the rate from the United States to Japan. This rate went into effect July 1st.

JAPAN'S FOREIGN TRADE, FIRST HALF-YEAR, 1905.--The general figures of Japan's foreign trade during the first half of the current year are as follows:--Exports,-Y-142,099,000; imports,-Y-283,949,000.

PERAK (F. M. S.) FORESTS.--The plantations under the care of the Forest Department are five in number costing in 1904 the sum of $10.700. The output for the year was 33,000 tons of timber, 106,000 tons of firewood and over 20,000 tons of charcoal.

FORESTRY IN THE YALU VALLEY.—Mr. Imagawa, an expert on forestry, accompanied by more than ten graduates from the Nara School of Forestry, are *en route* from Japan to the Basin of the Yalu to investigate the timber felling business there.

STANDARD OIL IN RANGOON.—The Lieutenant-Governor of Burma has refused an application by the Standard Oil Company of New York for a license for the storage of petroleum in bulk on a site on the Rangoon River and for permission to erect a refinery close to the site designated.

MANILA MACHINERY AGENCY.--The Huber Manufacturing Company of Marion, Ohio, manufacturers of agricultural machinery, has appointed Messrs. C. R. Duffin & Co., agents at Manila for its Far Eastern Business. The same concern also represents the Blymyer Iron Works Company.—*Commercial America.*

TECHNICAL COLLEGE, (F. M. S.)—This institution towards the establishment of which Towkay Loke Yew made a donation of $30,000, is reported to be in a fair way of being started on a sound footing. Selangor alone has promised $20,000 in subscriptions, while Perak and Negri Sembilan are yet to hear from. An engineer to take charge of the school has been employed in England.

ROAD-MAKING MACHINERY.—Messrs. Julian Scholl & Co., of New York City, have filled orders recently for road-making machinery for concerns in Hawaii. The firm makes the "Universal" steam rollers, for which no foreign market has been sought heretofore. The need of road-making machinery in the Philippines has been brought to the attention of this firm of late, and it is thought orders will result from inquiries received.--*Commercial America.*

STRAITS SETTLEMENTS TRADE, 1904.—The annual report on the Straits Settlements for 1904, signed by Mr. E. L. Brockman as acting colonial secretary, was recently laid before the Legislative Council. The trade of the year was not satisfactory. Imported merchandise stated in dollars decreased by over 3½ per cent and exports by over 6 per cent, but when the total amounts are converted into sterling, there are increases of about 4¾ per cent and 2¼ per cent respectively, the average exchange being advanced by more than 8½ per cent. The total value of trade excluding movements between the Settlements, as expressed in dollars, was as follows: 1904.--Imports, $325,868,032 and exports $255,438,661, a total of $581,306,693 as against $610,005,948 in 1903.

WESTINGHOUSE ENGINES IN JAPAN.—During the years 1903 and 1904 Messrs. Takata & Co., agents for the Westinghouse Machine Company in Japan, have sold no less than 56 Westinghouse engines, ranging from 600 h. p. down to 12½ h. p., and aggregating in capacity about 8,000 h. p. They are all of the vertical single-acting type, both simple and compound. The list of customers comprises government arsenals, railroads, electric light companies, bureaus, waterworks, mines, universities and hospitals. Among the most important orders were for the Akabane Arsenal, 1,950 h. p.; Kure and Tokyo Arsenals, 1,628 h. p.; Kiushiu and Nippon Railways, 579 h. p.; Yokoska Arsenal, 547 h. p.; Fukagawa and Tokyo Electric Light Companies, 450 h. p.; Mr. Furukawa's Western Bureau 1,265 h. p.; Tokyo Imperial University, 93 h. p.; Yokohama Electric Wire Works, 62 h. p.; and Tokyo Waterworks, 31 h. p.

WEAVING INDUSTRY JAPAN.--According to investigations there are now at work in the Japanese mills 6 443 power looms, against 5,085 in December last, and 4,891 last June, making an increase of nearly 30 per cent in the 12 months. In addition, 1,456 looms are being put up, and 936 more have been ordered, so that by the end of the year the total will be 8,835, nearly double what it was last year. There are other mills now being erected or projected not included in the above, which will probably bring up the total to 10,000 looms. Last year, with 4,891 looms in operation, the output was 80,947,000 yds. and the consumption of cotton 62,000 bales. With 10,000 looms in operation the output may be expected to rise to 170,000,000 yds. and the consumption of cotton to increase at the same rate. Although the war demand has contributed somewhat to the expansion of the industry, according to *The Yokohama Chamber of Commerce at Work*, even greater prosperity awaits it after the war with the opening and colonization of Korea and Manchuria.

ICE FACTORY, CANTON, CHINA.—The long-talked-of ice factory at Canton, China, seems at last to be within reasonable distance, and by the next hot season the Cantonites will be revelling in all the joys which it is possible to extract from a few pounds of ice on a hot day. After many delays, much trouble and disappointment, the clouds which have hitherto enveloped the promoters of this enterprise have apparently vanished and all is now clear sailing. The contract for the erection of the plant has been given to the Oriental Construction Company of Hongkong, Shanghai and Manila, which company, it is understood, expects to have the plant completed by August, 1906, and the stock of the enterprise has been eagerly accepted by the public since it was found that the project is now going to be pushed through to completion. It is believed Canton will prove a fine field for this industry, with a population of 2,000,000 people and another 1,000,000 scattered throughout neighboring towns, not counting the numerous foreigners who reside in the vicinity. With one railway line in operation and several more projected the city will become a considerable railway center soon, and an increased impetus will be given to all branches of trade.

STEEL WORKS, JAPAN.—An important feature of 1904 is the increasing production in Japan due to the Imperial Steel Works at Wakamatsu. Rails, bars, angles and plates are now being turned out in quantities by these works, while machinery is being ordered for the production of telegraph wire, rivets, bolts, nuts, etc. At present the whole of the production goes to meet government requirements, but in the near future the importers will find a serious competitor in this establishment. It may safely be said that but for the war most of the rails imported during the past year would have been manufactured in Japan at the Imperial Steel Works. Figures are not available, but it is known for certain that about 18,000 tons of 60-lb. rails were manufactured there for use in building the military lines in Korea, besides many thousand tons of lighter rails. The United Kingdom's share of the rail import to Japan is reduced to 10 per cent., the largest share in the trade falling to America. British prices have been higher than those of other countries, and besides this, British steamers have on certain occasions refused to carry railway material. Belgium and Germany have supplied several lots of tramway rails, a speciality not obtained in the United Kingdom.—*British Consular Report.*

FINANCIAL NEWS.

SHANGHAI LAND INVESTMENT COMPANY, LTD.--This company has just declared a dividend of Tls. 3 per share.

KOREAN LOAN IN JAPAN.—A Korean 7 per cent loan of -Y-2,000,000 is to be issued at 95 in Japan by the Daiichi Ginko.

CHINESE ENGINEERING AND MINING COMPANY.--This concern has just declared an interim dividend of 1 shilling per share (Coupon 4.).

HONGKONG AND WHAMPOA DOCK COMPANY, LTD., HONGKONG.—This concern intends to pay an interim dividend of $6 per share=12 per cent.

BANKS IN JAPAN.--There were 2,257 native banks, with a capital of -Y-524,529,119, and six foreign banks with -Y-4,114,450, in Japan, on the first day of June last.

CHINA FLOUR MILLS COMPANY, LTD., SHANGHAI.--An interim dividend of Tls. 5 per share, equal to 10 per cent, for the half-year ended June 30th, has just been paid by this company.

MITSU BISHI BANK.—The report of the Mitsu Bishi Bank for the first half of 1905 shows a divisable balance of -Y-2,195,475. It is proposed to pay a dividend of 5 per cent, and carry forward the balance.

HONGKONG AND WHAMPOA DOCK COMPANY, LTD.—Subject to audit, the directors of this company will declare a dividend at the forthcoming meeting of 12 per cent, equal to $6 per share, and carry forward about $500,000.

AUSTRALIAN RAUB GOLD MINING COMPANY, LTD., F. M. S.—The balance sheet and accounts of this company for the year ended March 31st, 1905, show a balance of £8,745 in the treasury, after liquidating all obligations.

UNITED ASBESTOS ORIENTAL AGENCY, LTD., HONGKONG.—The balance at the credit of profit and loss account for the year ended May 31st, 1905, is $14,451.41 The company pays a dividend of 20 per cent on ordinary shares.

COTTON MILLS AMALGAMATION, JAPAN.—The Miye, Nagoya and Owari cotton mills have decided to amalgamate and the latter two companies have requested the Nagoya Stock Exchange to suspend transactions in their shares on the exchange.

MOVEMENTS OF SPECIE, JAPAN.—As to the movements of specie at Yokohama, Kobe, Osaka and Nagasaki, during the first half of the current year, they were as follows:—*Exports*—Gold, Y 6,417,000; silver, -Y-430,000 *Imports*—Gold, -Y-16,756,000; silver, -Y-6,119,000. *Total* -Y-22,875,000. *Excess* of *Imports* Gold, -Y-10,339,000; silver, -Y-5,689,000. *Total* -Y-16,128,000.

TOKYO SEIKO KAISHA.—At a recent general meeting of the Tokyo Steel Foundry, the following balance sheet was passed:—Net profit, -Y-108,243,413; balance brought forward, -Y-19,270,308; total, -Y 127,513,721. To reserves, -Y-45,000,000; to special reserves, -Y-15,000,000; to dividends (20 per cent per annum,) -Y-45,000,000; carried forward, -Y-21,731,721.

NETHERLANDS TRADING SOCIETY.—The general balance sheet and profit and loss account of the Nederlandsche Handel-Maatschappij, for 1904, show that, after deducting current expenses, writing off bad debts, and with the addition of the balance brought forward from 1903, the net profits amount to *f*5,081,876.14, out of which a dividend of 11 per cent has been declared.

HONGKONG ELECTRIC COMPANY, LTD.—This company is now operating upwards of 34,500 lamps of 8 c. p., 85 arc lamps and 15 lifts, against last year 27,500 lamps of 8 c. p., 85 arc lamps and 12 lifts. Its earnings have increased correspondingly, the balance of profit and loss account amounting to $112,199.88 against $99,969.77 last year. A dividend of 10 per cent has been declared.

MANILA RAILWAY COMPANY, LTD.—Coupons of the Manila Railway Company, Ltd., 6 per cent "secured notes," due on June 30th, are being paid at the office of the London and County Banking Company, Ltd., and the coupons of the 6 per cent prior lien mortgage bonds, Series "A" and "B," due July 1st, are also being paid by the same financial corporation at its offices, 43 New Broad-st, London, E. C.

GEO. FENWICK & CO., LTD., HONGKONG.—Over, 5,000 of the new shares in Geo. Fenwick & Co., Ltd., engineers, etc., were subscribed for by July 1st last, the issue consisting of 6,000 shares, *viz.*, doubling the capital stock. The large number of shareholders resident in Europe and elsewhere accounts for the balance not yet having been applied for, as the company has not as yet offered them to the public.

TOKYO STREET RAILWAY COMPANY.—At the general meeting of this corporation, recently held in Tokyo, the following accounts were submitted:—Net profit, -Y-458,016,452; balance brought forward, -Y-2,042,617; total, -Y-460,059,069. To reserves, -Y-22,900,820; to special reserves, -Y-22,900,820; to first dividend, -Y-210,000,000; to Tokyo City, -Y-67,404,904; to directors' and auditors' fees, -Y-15,000,006; to second dividend, -Y-121,200,000; carried forward, -Y-652,480.

SHANGHAI LIFE INSURANCE COMPANY, LTD.--The business of this company thus far this year gives promise of flattering results by the end of 1905. At the first ordinary general meeting of shareholders recently held in Shanghai the chairman announced that in the past four months applications had been received for insurance amounting to Tls. 361,000 of which sum Tls. 337,510 had been accepted and Tls. 23,500 had been declined.

HONGKONG ELECTRIC COMPANY, LTD.—The report of the board of directors to the sixteenth ordinary annual meeting of this concern gives a statement of the company's account for the year ended April 30th, 1905. The balance at credit of profit and loss account is $112,199.88; after deducting directors' fees ($3,000), there remains the sum of $109,199.88, and the directors recommended that this be disposed of as follows:—To pay a dividend of 10 per cent, $1 per share on 30,000 fully paid shares, $30,000, and 50 cents per share on 30,000 part paid shares, $45,000; to write off plant account for depreciation, $62,084.76; to carry forward to current account, $2,151.12.

FAR EASTERN STOCKS AND QUOTATIONS

COURTESY OF BENJAMIN, KELLY & POTTS, SHAREBROKERS, HONGKONG, August, 1905.

STOCKS	WHEN ESTAB-LISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation* PER CENT	CLOSING QUOTATIONS
Banks.												
Hongkong and Shanghai Banking Corporation	1865	$10,000,000	80,000	$125	$125	g £1,000,000 s $8,000,000 i $250,000	$1,493,408	31-12-04	£1.10/. and bonus £1 @ exchange 1/11 9-16=$25.46 for second half-year 1904	20-2-05	5%	$915 London £90
National Bank of China, Limited	1891	£699,475	99,925	£7	£5	$200,000	$41,768	31-12-04	$2 (London 3/6) for 1903	1-2-04	—	$38 buyers
Marine Insurances.												
Canton Insurance Office, Limited	1881	$2,500,000	10,000	$250	$50	$1,400,000 j $81,739	$150,494	31-12-03	$17 for 1903	22-10-04	5¼%	$325 buyers
China Traders' Insurance Co., Ld.	1865	$2,000,000	24,000	$83.33	$25	$950,000 f $151,992 j $362,366 u $371,445	Nil.	30-4-04	$4½ for year ended 30-4-1904	8-12-04	6%	$74
North China Insurance Co., Ld.	1863	£150,000	10,000	£15	£5	T800,000	T217,119	30-6-04	Interim of 7/6 for 1905	1-5-05	8%	T82
Union Insurance Society of Canton, Limited	1867	$2,500,000	10,000	$250	$100	s $1,850,000 g £20,000 f $372,749 j $893,110 u $846,773	$2,078,997	30-6-04	$35 for 1903	21-1-04	5%	$725 buyers
Yangtsze Insurance Association, Ld.	1862	$800,000	8,000	$100	$60	$750,000 j $50,000 f $5,890	$599,364	31-12-04	$12 and $3 special dividend for 1903	12-4-05	8½%	$172½
Fire Insurances.												
China Fire Insurance Co., Ld.	1870	$2,000,000	20,000	$100	$20	$1,000,000 x $218,039 f $2,241	$260,374	31-12-04	$6 dividend and $1 bonus for 1903	10-3-05	8¼%	$85 sales
Hongkong Fire Insurance Co., Ld.	1868	$2,000,000	8,000	$250	$50	$1,200,505	$360,372	31-12-04	$34 for 1903	7-3-05	11¼%	$305
Shipping, Tug and Cargo Boats.												
China and Manila Steamship Co., Ld.	1882	$750,000	(1) 30,000	$25	$25	$5,000	$8,832	31-12-04	$1 for 1904	27-3-05	5%	$20 sellers
Douglas Steamship Co., Ld.	1883	$1,000,000	20,000	$50	$50	$185,000 i $85,439	Nil.	30-6-04	$2 for year ended 30-6-1904	29-9-04	5¾%	$35 sellers
Hongkong, Canton and Macao Steamboat Company, Ld.	1865	$1,200,000	80,000	$15	$15	e $250,000 d $600,000 f $158,444	$26,160	31-12-04	$1 for second half-year 1904	15-2-05	9½%	$26½
Indo-China Steam Navigation Company, Ld.	1882	£1,200,000	(2) 60,000	£10	£10	£120,000 i £241,150 h £3,999	£4,435	31-12-04	12/. @ 1/10 7-8=$6.29.51 for 1904	13-7-05	6¾%	$92 sellers
Shanghai Tug and Lighter Co., Ld. Do. Preference.	1903	T1,500,000	200,000 100,000	T50	T50	i T25,000	T43,762	31-12-04	Final of Tls 2¼ making Tls. 4½ / Tls. 1½ making Tls. 3½ for '04	1-3-05	7½% 7½%	T60 sellers T50 sellers
"Shell" Transport & Trading Co., Ld.	1898	£2,000,000	2,000,000	£1	£1	£400,000 i £4,116	£58,852	31-12-03	Interim of 1/. (Coupon No. 5) for '04	1-1-05	4½%	21/. sellers
"Star" Ferry Co., Ld.	1898 1900	$200,000	10,000 10,000	$10 $10	$10 $5	$65,000 i $24,257	$929	30-4-05	$1.80 / $0.90 cents for year ended 30-4-05	29-5-05	5¼% 3½%	$34 sellers $26 sellers
Straits Steamship Co., Ld.	1890	$500,000	(3) 5,000	$100	$100	$400,000 e $21,075 i $230,153	$21,231	31-12-04	$10 for 1904	12-3-05	7%	$142
Taku Tug and Lighter Co., Ld.	—	T. T1,500,000	30,000	T. T50	T. T50	e T102,000 d T212,614	T6,190	31-12-04	T1¼ final making T3¼ for 1904	29-2-05	11%	T30
Refineries.												
China Sugar Refining Company, Ld.	1878	$2,000,000	20,000	$100	$100	e $450,000	$42,812	31-12-04	Final of $15 making $20 for 1904	24-3-05	9¼%	$210 buyers
Luzon Sugar Refining Company, Ld.	1882	$700,000	7,000	$100	$100	none	Dr. $85,987	31-12-04	$3 for 1897	24-3-98	—	$29 sellers
Perak Sugar Cultivation Co., Ld.	—	T350,000	7,000	T50	T50	T100,000	T1,635	30-9-04	T2½ for year ending 30-9-04	17-12-04	3¾%	T70 sales
Mining.												
Chinese Engin'ring and Mining Co., Ld.	1901	£1,000,000	1,000,000	£1	£1	q £40,000	£7,820	29-2-04	Interim of 1/. (No. 4)	...-7-05	—	T8 sellers
Oriental Consolidated Mining Co., Ld.	1901	G.$5,000,000	y 500,000	G. $10	G. $10	none	G. $672,093	31-12-04	Interim of 50cts. (gold) for '95 (No. 5)	11-7-05	5¾%	G. $17
Raub Australian Gold Mining Co., Ld.	1892	£200,000	150,000 50,000	£1 £1	18/10 £1	£4,873	Dr. £4,029	31-3-04	No. 12 of 1/.=48 cents	28-1-01	—	$6 sellers
ociété Francaise des Charbonnages du Tonkin	1888	F.4,000,000	16,000	F.250	F.250	l F307,740 a F1,529,652	F.87,333	31-12-03	Final of F.25, making F. 50 for 1903	1-9-04	—	$490

STOCKS	WHEN ESTABLISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation* PER CENT	CLOSING QUOTATIONS
Docks, Wharves and Godowns.												
Farnham, (S. C.) Boyd & Co., Ld.	1901	T5,520,000	55,200	T100	T100	T1,000,000	T34,924	30-4-05	Final of T8 making T13 for 1904/05	24-6-05	9¼%	T142
Fenwick (Geo.,) & Company, Ld.	1889	$450,000	6,000	$25	$25	$70,000	$8,577	31-12-04	$3¾ for 1904	13-3-05	13 %	$29
	1905		z 12,000						First year	—	—	$27 new issue
Hongkong and Kowloon Wharf and Godown Co., Ld.	1886	$2,000,000	40,000	$50	$50	$250,000 q $58,423 i $10,000 w $300,000	$29,422	31-12-04	Final of $2½ making $5 for 1904	11-3-05	5¼%	$97½ buyers
Hongkong & Whampoa Dock Co., Ld.	1901	$2,500,000	50,000	$50	$50	i $33,500	$498,289	31-12-04	$6 div. & $1 bonus for 2nd ½ year '04	21-2-05	7¾%	$198 buyers
Howarth Erskine, Ld.	1901	$1,200,000	12,000	$100	$100	$60,000	—	30-6-04	$10 div. & $5 bonus for the year	... 8-04	5½%	$270 sellers
New Amoy Dock Co., Ld.	1892	$40,500	6,000	$6¾	$6¾	$55,500	$489	31-12-03	$1¼ for '03	5-5-04	7 %	$18 sellers
Riley Hargreaves & Co., Ld.	1899	$875,000	6,000	$100	$100	$150,000	$40,936	31-12-03	$10 div. and $2½ bonus for '03	7-3-04	5½%	$250
Do. (Preference)			2,750						$7 dividend for '03		6¼%	$111½
Shanghai and Hongkew Wharf Co.	1902	T3,200,000	32,000	T100	T100	b T487,210 r T59,880	T10,711	31-12-04	Final of T6 making T10 for '04	30-3-05	5½%	T192½ sellers
Tanjong Pagar Dock Co., Ld.	1864	$3,700,000	37,000	$100	$100	$2,100,000	$206,645	31-12-04	$20 for second ½ year making $26 for '04	20-3-05	6¾%	$380 sales
Yangtsze Wharf and Godown Co., Ld.	1902	T250,000	2,500	T100	T100	T17,500	T2,762	31-12-05	T18 for '04	29-3-05	9¼%	T192½ buyers
Lands, Hotels and Buildings.												
Astor House Hotel Co., Ld. (Shanghai)	1901	$750,000	(4) 30,000	$25	$25	none	$9,989	30-6-04	$2½ for year ending 30-6-04	30-8-04	8 %	$31¼
Astor House Hotel, Ld. (Tientsin)	—	T. T100,000	2,000	T. T50	T. T50	T34,000 e T8,000	T806	29-2-05	Final of T5 making T9 for the year	20-4-05	6¼%	T135 sales
Central Stores, Ld.	—	$91,845	6,000	$15	$12	$20,000	$1,502	31-12-04	Final of 60 cents making $1.80 for 04	30-3-05	10 %	$18 sales
Do. (Founders')			123	$15	$12				None	—	—	$100
Do. (New Issue)	1904	$360,000	24,000	$15	$7½				Preferential of 7% for '04	30-3-05	7 %	$7½ sales
Hongkong Hotel Co., Ld.	1866	$600,000	12,000	$50	$50	$100,000 r $10,000	$3,554	31-12-04	$5 for 2nd half-year making $10 for '04	30-3-05	7¼%	$138 buyers
Hongkong Land Investment and Agency Co., Ld.	1889	$5,000,000	50,000	$100	$100	e $250,000	$37,875	31-12-04	Final of $6 making $12 for '04	31-1-05	5¾%	$120 buyers
Hotel des Colonies Co., Ld. (Shanghai)	1902	T225,000	9,000	T25	T25	n T20,986	T7,202	31-3-05	T2½ for the year ending 31-3-05	18-5-05	13 %	T19
Hotel Metropole Company, Limited	1904	$200,000	2,000	$100	$100	—	First	year	Interim of $4	26-1-05	...	$105
Humphreys' Estate & Finance Co., Ld.	1887	$1,500,000	150,000	$10	$10	i $200,994 e $50,000	$11,958	31-12-04	90 cents for '04	11-2-05	7¼%	$12½
Kowloon Land and Building Co., Ld.	1889	$300,000	6,000	$50	$30	none	$377	31-12-04	$3 for '04	31-1-05	7½%	$40 sellers
Shanghai Land Investment Co., Ld.	1901	T2,600,000	52,000	T50	T50	T828,813 e T170,000	T40,066	31-12-04	Interim of T3 for '05	21-7-05	6¾%	T122 ex div.
Tientsin Hotel des Colonies, Ld.	1903	T70,000	1,400	T50	T50	none	T670	31-12-04	T5 for '04	1-3-05	10½%	T47 sellers
Tientsin Land Investment Co., Ld.	1902	T772,600	7,726	T100	T100	i T67,300	T725	31-12-04	T4 final making T7 for '04	29-2-05	5¾%	T120 sellers
Wei-hai-wei Land and Building Co., Ld.	1899	T91,850	3,764	T25	T25	none	T687	31-12-04	None	—	—	T12 buyers
West Point Building Co., Ld.	1889	$625,000	12,500	$50	$50	none	$1,247	31-12-04	Final of $1.70 making $3.20 for '04	31-1-05	6 %	$52 sales
Cotton Mills.												
Ewo Cotton Spinning and Weaving Co., Ld.	1895	T750,000	15,000	T50	T50	none	T12,844	31-10-04	T4 for year ended 31-10-03	22-12-03	8½%	T50 sales
Hongkong Cotton Spinning, Weaving and Dyeing Co., Ld.	1901	$1,250,000	125,000	$10	$10	none	$22,862	31-7-04	50 cents for year ended 31-7-04	12-9-04	3 %	$16½ sellers
International Cotton Manufacturing Co., Ld.	1895	T750,000	(5) 10,000	T75	T75	T50,000	T13,629	30-9-04	Interim of 3% a/c 1898	30-4-98	—	T45 sales
Laou-kung-mow Cotton Spinning & Weaving Co., Ld.	1895	T800,000	(6) 8,000	T100	T100	none	T10,000	31-12-04	Interim of 4% a/c 1898 on 6,000 shares	1-8-98	—	T52½ buyers
Soy Chee Cotton Spinning Co., Ld.	1895	T1,000,000	2,000	T500	T500	l T5,658	T22,051	31-12-04	4% for 1897	2-2-98	—	T160 buyers
Cigar and Tobacco Cos.												
Alhambra, Limited	1898	$60,000	300	$200	$200	none	Dr. $2,584	31-12-04	$125 for year ending 30-6-1900	15-8-01	—	$100
Philippine Company, Limited	1904	$675,000	67,500	$10	.$10	—	—	—	First year	—	—	$9½ sellers
Shanghai-Sumatra Tobacco Co., Ld.	1902	T600,000	(7) 30,000	T20	T20	T24,820 v T25,000	T1,297	31-10-04	Final of T6 making T9	8-3-05	13½%	T68 sales
Miscellaneous.												
Anglo German Brewing Co., Ltd.	1905	$400,000	4,000	$100	$100	—	—	—	First year	—	—	$118 sales
Bell's Asbestos Eastern Agency, Ld.	1895	£5,377.10s	8,604	12/6	12/6	£314	£770	31-12-04	1/3 per share for '04	21-7-05	12 %	$6¼ ex div.
Campbell, Moore & Co., Ld.	1886	$12,000	1,200	$10	$10	$8,000	$1,182	31-12-04	$3 for 1904	1-4-05	8¼%	$36
China-Borneo Co., Ld.	1903	$720,000	(8) 60,000	$12	$12	none	—	31-12-04	$1 for 1904	17-3-05	8½%	$11¾
China Flour Mill Co., Ld.	—	T200,000	4,000	T50	T50	T30,000	T718	31-12-04	T5 for 1904	24-3-05	8 %	T63½ sales
China Light and Power Co., Ld.	1901	$300,000	30,000	$10	$10	none	$3,739	29-2-04	None	—	—	$10
China Provident Loan and Mortgage Co., Ld.	1898	p$1,000,000	100,000	$10	$10	$80,000	$1,581	31-12-04	80 cents for 1904	18-1-05	9¼%	$8½ buyers
Dairy Farm Company, Ld.	1896	$187,500	25,000	$7½	$6	—	—	31-7-04	$1¼ for year ending 31-7-03	20-11-03	—	$17 sellers

STOCKS	WHEN ESTABLISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation* PER CENT	CLOSING QUOTATIONS
Miscellaneous.—Continued												
Fraser & Neave, Ld.	1898	$225,000	4,500	$50	$50	$112,500	$2,706	31-12-03	$5 dividend and $2½ bonus for '03	26-3-04	7½%	$100
Green Island Cement Co., Ld	1889	$1,500,000	150,000	$10	$10	w $400,000 / $500,000	$95,054	31-12-04	$2 for 1904	27-2-05	7½%	$26½ sellers
Hall & Holtz, Ld.	—	$420,000	(9) 21,000	$20	$20	$186,000	$7,551	29-2-05	Final of $1½ making $2½	15-4-05	9¼%	$27 sales
Hongkong and China Gas Co., Ld.	1864	£70,000	7,000	£10	£10	f £25,394 / £3,000	£8,188	31-12-04	Final of 6% & bonus of 1% making 22s. for 1904	25-5-05	7½%	$170 buyers
Hongkong Electric Co., Ld.	1889 / 1899	$600,000	30,000 / 30,000	$10 / $10	$10 / $5	none	$2,151	30-4-05	$1.00 / 50 cents for year ending 30-4-05	17-7-05	6¼% / 4¾%	$16 ex div / $10 ex div
Hongkong High-Level Tramways Co., Ld.	1887	$125,000	1,250	$100	$100	$50,000	$2,796	30-11-04	$15 for year ending 30-11-04	24-12-04	7 %	$212½ buyers
Hongkong Ice Company, Ld.	1881	$125,000	5,000	$25	$25	k $60,000	$5,356	31-12-04	Final of $13 making $17 for 1904	14-2-05	7 %	$242½ sellers
H'kong Rope Manufacturing Co., Ld.	1883	$500,000	10,000	$50	$50	$60,000	$11,137	31-12-04	$10 for 1904	10-4-05	7 %	$152 buyers
Hongkong Steam Waterboat Co., Ld.	1900	$150,000	15,000	$10	$10	$2,500	$299	30-9-04	Interim of 50 cents for half year ended 31-3-1905	3-6-05	12½%	$15
Katz Brothers, Ld.	1896	$1,000,000	10,000	$100	$100	$475,000	$3,400	31-12-04	$8 for 1904	...-3-05	6 %	$135 buyers
Lane, Crawford & Co., Ld. (Shanghai).	1903	$250,000	2,500	$100	$100	none	$21,582	29-2-04	Interim of $5	19-11-04	7¼%	$145 buyers
Maatschappij tot Mijn-, Bosch- en Landbouwexploitatie in Langkat	1902	G.2,500,000	25,000	G.100	G.100	T528,210 / T19,465	T35,849	31-10-04	2nd quarterly dividend of T5 making so far T12½ for '05	15-6-05	19 %	T185 buyers
Maynard & Co., Ld	1901	$34,000	3,400	$10	$10	none	—	31-10-04	$2 for year ended 31-10-04	3-12-04	9 %	$23
Mondon, (E. L.) Ld	1902	T350,000	7,000	T50	T50	none	Dr. T117,638	31-12-04	T5 for 1902	2-5-03	—	T25
Moutrie (S.) & Company, Limited	1899	$200 000	4,000	$50	$50	$5,000	$832	30-6-04	Final of $3 making $5 for year ending 30-6-04	28-12-04	9 %	$54 sales
Shanghai and Hongkong Dyeing and Cleaning Co., Ld.	1903	$60,000	1,200	$50	$50	none	Dr. $5,537	31-8-04	None	—	—	$50
Shanghai Gas Co., Ld.	1903	T800,000	16,000	T50	T50	q T145,000 / T108,172	T8,011	31-12-04	T3½ final and T1½ bonus making T8½ for '04	8-3-05	7 %	T122½ buyers
Shanghai Horse Bazaar Co., Ld.	1904	T270,000	5,400	T50	T50	T45,000	T10,247	31-12-03	T5 for 1903	8-4-04	6 %	T80
Shanghai Pulp and Paper Co., Ld.	—	T450,000	4,500	T100	T100	T25,000	T6,968	31-12-04	Final of T8 making T14 for '04	28-2-05	8¼%	T167½
Shanghai Waterworks Co., Ld.	1881	£144,000	7,200	£20	£20	T170,000	T17,220	31-12-04	Final of 37/6 making 52/6 for '04	6-4-04	4½%	T450 buyers
Singapore Dispensary, Ld.	1891	$30,000	600	$50	$50	$20,000	$1,769	31-7-04	$6¼ for year ended 31-7-04	19-9-04	7¾%	$80 sellers
South China Morning Post, Ld.	1903	$150,000	6,000	$25	$25	none.	Dr. $5,068	29-2-05	None	—	—	$21½
Steam Laundry Co., Ld.	1902 / 1904	$75,000	5,000 / 10,000	$5 / $5	$5 / $5	none	$3,644	31-5-04	60 cents for year ended 31-5-04 / First year	2-8-04 / —	7¾% / —	$8 buyers / $7½ buyers
Straits Ice Company, Ld.	1884	$200,000	2,000	$100	$100	$25,000	$700	31-12-04	$10 for second half year '04	...-2-05	13¼%	$150 buyers
Straits Trading Co., Ld.	1887	$2,500,000	250,000	$10	$10	e $750,000 / $50,000	$84,813	30-9-04	$1 dividend and 35 cents bonus for half year ended 31-9-04	9-12-04	6¾%	$41½ buyers
Tientsin Native City Waterworks Co., Ld.	1902	T356,000	3,560	T100	T100	none	T2,025	31-12-04	T2 for 2nd half year '03	9-3-04	—	T. T100
Tientsin Waterworks Co., Ld.	1901	T. T200,000	2,000	T. T100	T. T100	e T15,259 / T$4,000	T1,012	30-4-05	Final of T4½ making T8½ for '03/5	20-6-04	7 %	T. T120
United Asbestos Oriental Agency, Ld. / Do. do. (Founders')	1896	$100,000	9,900 / 100	$10 / $10	$4 / $10	$20,000	$480	31-5-04	90 cents / $29.70 for year ended 31-5-04	6-8-04	9¼% / 16½%	$9½ sellers / $180 buyers
Watson (A. S.) & Co., Ld.	1886	$900,000	90,000	$10	$10	e $300,000 / $25,000	$6,096	31-12-04	Final of 50 cents making $1 for '04.	29-5-05	8 %	$12½ buyers
William Powell, Ld.	1901	$120,000	12,000	$10	$10	e $3,000	$588	30-6-04	Interim of 50 cents for year 1904/5.	10-4-05	10½%	$11¾ sellers

LOANS AND DEBENTURES	AGENTS FOR THE LOAN	AMOUNT OF LOAN	PAR VALUE	OUTSTAND'G BONDS	WHEN PAYABLE.	CLOSING QUOTATIONS
Chinese Government, 7 per cent. Silver Loan 1886 E.	Hongkong Shanghai Bk. Cor.	T767,200	T250	1969	Mar. 31st & Sept. 30th each year until Mar. 31st, 1917.	par. (Plus accrued interest)
Hongkong Hotel Co., Ltd., 6% Mortgage Debentures of 1899‡	Hongkong Shanghai Bk. Cor.	$500,000	$500	§ all	Half yearly, June 30th and December 31st	par. (Plus accrued interest)
Shanghai & Hongkew Wharf Company Ltd. 6% Debentures of 1902	Hongkong Shanghai Bk. Cor.	T543,900	T100		Half yearly, June 30th and December 31st	T96 (Plus accrued interest)
Astor House Hotel Co. Ltd. 8% Debentures of 1903	Hongkong Shanghai Bk. Cor.	T500,000	T100		Half yearly, January 1st and July 1st	T105 (Plus accrued interest)
Chinese Engineering & Mining Co., Ltd., 6% Debentures of 1902†		£500,000	¶	£480,000	Half yearly, June 30th and December 31st	par. (Plus accrued interest)
International Cotton Manufacturing Co. Ltd. 6% Debentures of 1901	Russo Chin. B.	T500,000	T100		Half yearly, March 31st and September 30th	par. (Plus accrued interest)

a Amortisation Fund.
b Building Reserve Account.
c Capital Reserve Fund.
d Depreciation and Insurance Fund.
e Equalization of Dividend Fund.
f Exchange and Investment Fluctuation Account.
g Gold Reserve Fund
h Exchange Reserve Account.
i Insurance Fund.
j Reinsurance Fund.
k Contingencies Account

l Legal Reserve Fund.
m
n Sinking Fund.
o
p Authorized capital $2,000,000.
q Depreciation and Repair Fund.
r Repairs and Renewals Account.
s Silver Reserve Fund.
t
u Underwriting Suspense Account.
v Special Works Fund.

w Premium on New Issue.
x Extra Reserve Fund.
y 75,000 owned by the Company.
z 6,000 shares unissued.
1 5,725 shares unissued.
2 First issue of 60,000 of which 10,411 unallotted.
3 785 shares unissued.
4 7,600 shares unissued.
5 1,616 shares unallotted.
6 842 shares unallotted.
7 Only 13,000 shares issued.

8 14,000 shares unissued.
9 399 shares unissued.
* Based on last year's dividend.
§ 270 held by the Company.
¶ In certificates of £20 and £100
‡ Redeemable in 10 years, or at option of Company the Company giving 6 months' notice.
† Redeemable at par at rate of £10,000 per annum from 31st December, 1903 to 31st December, 1952.
Dr. Deficit.

FAR EASTERN REVIEW

COMMERCE ❂ ENGINEERING ❂ FINANCE

VOL. II. MANILA, P. I., SEPTEMBER, 1905. No. 4.

SIR THOMAS JACKSON, BART.

(See page 91.)

FAR EASTERN REVIEW

COMMERCE :-: ENGINEERING :-: FINANCE

A MONTHLY REVIEW OF FAR EASTERN TRADE, FINANCE, AND ENGINEERING. DEDICATED TO THE INDUSTRIAL DEVELOPMENT AND ADVANCEMENT OF TRADE IN THE PHILIPPINES AND FAR EASTERN COUNTRIES.

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MANILA AND SHANGHAI, SEPTEMBER, 1905

JAPAN'S ELECTRICAL DEVELOPMENT.

Singular scientific perfection is apparent in Japan's internal and economic workings despite the turbulence and bloody struggles of the war through which this wonderfully progressive empire has just passed. The intelligent application of the knowledge of the western world has left its imprint upon Old Japan.

The modernness of Tokyo has amazed the traveler. Trolley cars, telephones, telegraphs and electric lights abound. The central stations of Japan exhibit the newness of our own. The agents of this extraordinary nation are in every civilized land on the globe, procuring information and devices suitable to her development. Electrical papers have been published for many years in pure Japanese. Science and its most practical undertakings have been the sign posts along the national road to success. Motor and dynamo building plants are being established, and the pulse and beat of the entire nation, in a commercial and industrial sense, partakes of the character of its western teachers.

Water power abounds in many places in Japan, and coal crops out from the soil with every evidence of plentitude. To some extent these natural resources have been utilized; perhaps to an extent which seems limited. Yet considering the accomplishments in other directions, as intense an activity will be manifested in the near future in regard to electrical central stations, their increased capacity and duplication.

The present consumption by Japan of lamps, wire, dynamo, electric machinery, and a hundred other electrical accessories, indicates the future growth of an extensive business in such supplies. She is building her trolley roads and constructing and equipping her central stations in a solid and permanent manner. When her affairs are settled by the restoration of peace, we are bound to hear more of the electrical development of Japan. The future of the trolley and necessarily of the central station in this country is very bright. Japanese electrical engineers are looking out for that. They are also taking in the points of interest, in connection with all electrical enterprises in other countries. It is only to be expected, therefore, that electricity will become as useful and as general a servant to the Japanese as to the western people.

Tokyo and Yokohama are very much up-to-date at this writing. What will be done in Manchuria will be best known after peace is reestablished. With resources like those of the United States there is every possibility that here the manipulations of the electrician will transform the cities and outlying districts into scenes of bustle and activity. If precedent counts for anything, it will show how Japan and the new province over which her influence must dominate will grow, more by reference to America than perhaps any nation on the face of the globe.

The Philippines are destined to be the connecting link between the United States and Japan. In these new possessions of ours electrical enterprises are rapidly growing. Japan has not very far to come to study the results of a few years of American influence in these Islands. What she has and will accomplish herself is not difficult to imagine. The lighting of the large Japanese cities is almost entirely in the hands of the new generation, and the central station has become a fixed feature of Japanese life.

WATERWHEEL SYSTEM OF POWER.

Water power for industrial purposes seems to be developing under a strong impetus throughout the Orient. While little attention has been given to this natural force in the Philippine Islands, there are many possibilities here for the utilization of water for mining and manufacturing purposes, and with our own industrial progress it seems certain that water power will be an important element in the establishment of factories and the opening up of the milling and mining resources of the Islands, as well as in the installation of electric lighting and power throughout the provinces.

Enormous strides in electrical power transmission, with which water as a propelling force is so closely allied, have made possible the development of forces which are far removed from the point of application, with the result that the utilization of the modern waterwheel and the demand for it, are on the increase.

In this connection it is interesting to note the high degree of perfection which the modern waterwheel has attained. American wheels seem to have become a distinct science in themselves, and on account of the perfection to which they have been raised they are rapidly becoming standard the world over.

It is conceded that electric transmission of energy is now the most important factor in the industrial field of the Orient, where everything in the way of machinery that is most modern and economical is in demand. Development on this line is just now phenomenal in the Far East, and the achievements throughout the Orient can scarcely be credited from the standpoint of a few years ago in other parts of the world.

The first successful experiment in long-distance electric transmission was made in Germany in 1891, where a small amount of power was transmitted from Lauffin to Frankfort, and used in connection with an industrial exposition held there at the time. In less than a year thereafter a Pelton waterwheel, which is manufactured in San Francisco, was driving a generator at the plant of the San Antonio Light and Power Company, in Pomora, Cal., and transmitting electricity for power and light a distance of forty-five m. This was the first real commercially operative system of electric transmission that was ever installed.

The development was rapid from this time on, with the result that today a transmission of 100 m. is of quite common occurrence, and thousands of h. p. are being transmitted for a distance of nearly 300 m. It has been demonstrated that the limit of distance to which power can be economically transmitted depends solely on the cost of the line conductors; hence, it is difficult to forecast the development which is to come. And with water as the motive force, under all ordinary conditions electricity is conceded to be the most economical and reliable power known.

As an illustration of the increasing demand for waterwheels it is noted that in electrical plants alone there are 326 stations aggregating 283,000 h. p. in Pelton wheels, and in this number are represented plants in Japan, China, the Hawaiian Islands, India, Malaysia, and Australasia. In these countries electrical development is assuming remarkable proportions, and while it can not be stated that water power is the system most in demand, where utilization is practicable the waterwheel is commanding full consideration.

ANOTHER GREAT TRADE ROUTE.

The completion of the railroad now under construction across the Isthmus of Tehauntepec, in Mexico, will herald the appearance of another great factor for the carrying trade of the Pacific. The railroad is being rapidly completed by the great engineering firm of Messrs. S. Pearson & Sons, Ltd., of London, the managing directors of the Tehauntepec Railroad Company, who hold the concession from the Mexican Government, and the line is expected to be open to traffic by the latter part of next year.

The American-Hawaiian Steamship Company, operating a line of steamers between New York, Seattle, and the Hawaiian Islands, has just closed a contract with Messrs. Pearson & Sons for the transportation of all the freight carried by the steamers between Atlantic and Pacific ports on the completion of the road. The steamship company controls the bulk of the sugar shipments from Hawaii to the United States, having in completion a fleet of nine steamers with a total cargo capacity of 75,000 tons, and has recently ordered from the Union Iron Works, of San Francisco, two additional freight steamers of 12,000 tons cargo capacity each, representing an outlay of over $2,000,000 gold. The speed will be 12 knots and the boilers will be equipped for burning oil.

With the opening of the railroad across the isthmus, and the shortening of the trade route to New York, it would release some of the steamers, and with favorable rates the company may be expected to extend its lines to the Far East.

MANUFACTURING DEVELOPMENT.

The awarding of the contract for two large freight steamers to the Union Iron Works, at San Francisco, marks a revival of the industry on the Pacific seaboard. Secured in the face of keen competition from the eastern shipbuilders, it is indicative of the ability of the West to cope with the rapid change in conditions which lost some of the larger work in the last two years. The slack period was utilized in enlarging and increasing the facilities of the plants, and again the future holds out bright prospects.

The rapid growth of Oriental trade calls for the construction of many new ships, and the signs point to the fact that the western shipbuilders, with characteristic confidence in the future, are determined that the work will be done at home.

On a par with this aggressive spirit, is the enterprise displayed by the Honolulu Iron Works. Far distant from the source of raw material, compelled to carry enormous stocks to escape the delays in transportation and delivery, this company has forged ahead to a position unrivalled by any similar concern in its line of business. With the establishment of the most modern engineering plant West of the Mississippi River, the works were able to fully meet all the local demands for heavy sugar machinery, establishing a record for the efficiency of their mills. With slack business in the Hawaiian Islands, the company has turned around and is now competing for the trade in Mexico, Cuba, and Louisiana. Offices have been opened in New York with this object in view, and at an early date a similar office will be opened in Manila, anticipating the revival of the sugar industry in the Philippines, and to be in close touch with the large estates of Java and the East Indies.

MINERALS OF THE PHILIPPINES

The last annual report of the Mining Bureau of the Philippine Government, recently issued by Mr. H. D. McCaskey, chief of the bureau, is a concise and interesting statement of the mineral resources of these islands, based as it is on the field work done by the bureau, on statements of explorers and prospectors, and on the best work of the Spanish authorities. All the information up to date is comprehensively summarized.

According to the report gold has been found in almost every island of importance in the archipelago. It has been worked by natives in placers and in stringers from time immemorial, and the total production of the islands must have been considerable indeed, although no reliable statistics have ever been kept. The manager of one of the local banks is authority for the statement that at one time a great deal of nugget and other alluvial gold was received at the bank. Richard von Drasche, a German geologist who has done some field-work in the islands and has published important papers upon Philippine geology, states that at the time of his visit to Mambulao and Paracale (Camarines province) there were over 700 natives working the placer deposits for gold. It was estimated by a Spanish governor of Manila of the seventeenth century that the annual output of gold from Camarines Norte was about $200,000. This seems well within possibility and is an indication of what was yielded to native methods. The natives in no part of the islands have been able to dredge or sluice, nor have they penetrated more than 50 or 100 ft. into the rock at any place. Abella states, in his 'Ligera Reseña de la Minera de las Islas Filipinas,' that from 3,000 to 4,000 pesos worth of gold was taken annually from the streams in the mountains of Bulacan near Santa Maria de Pandi. This statement has not appeared elsewhere, to the knowledge of this Bureau, and it is not known upon what information it is based. It is believed, however, that a great deal of placer gold has been obtained in the past by natives of Bulacan. It has been estimated by Centeno (1876) that the placer output of the Misamis and Pigtao fields in northern Mindanao has been, in the hands of the natives, about $27,000 per annum; and William Asburner, an American mining engineer, states that he was informed that $20,000 worth of gold had been taken by natives from the placer fields of Surigao, in northern Mindanao, in 1882. No figures are yet available from Benguet or Lepanto, but a prominent mining engineer recently stated that during his visit last year in Benguet two American miners obtained 20 lbs. of gold from rich stringers in seven days. It is known that some of these stringers worked by the natives have been enormously rich. The greater number of the richer placers readily accessible to man have probably been pretty thoroughly worked over from the surface, but it is known that the natives, and Spaniards also, have seldom gone to bedrock.

From the Pigholugan region, in northern Mindanao, J. Clayton Nichols, an American mining engineer, states that he was informed that $4,000 was taken from one hole and $2,500 from another. In the northern part of Masbate, near Arroroy, three American mining companies have recently staked out and recorded a large number of placer and lode claims, and work is going on upon these at the present time. It is understood that an American consulting engineer who has recently visited and reported upon this field was favorably impressed with the outlook for mining the alluvial gold in that region. A number of placer claims have also recently been staked and recorded by Americans in the head waters of the San Mateo river, in Rizal. In the Pigtao region of northern Mindanao, Mr. Nichols estimates the value of the gravels to be from 15 to 25c. to the cubic yard, in such quantity as to suggest the careful study of that field with respect to the use of the steam dredge.

In addition to the districts mentioned above, gold has been worked to a greater or less extent by the natives in Fidelisan, Bontoc province; Suyoc, Dugon and Tuboc, Lepanto province; Acupan, Tabio, Capunga and Itogas, Benguet province; Capan and Peñaranda, Nueva Ecija province; the islands of Polillo and Catanduanes, Labo, Capalongan and Maculabo, in the Camarines; Atimonan, in Tayabas; and in Cebu, Panay, Samar and Panaon.

The gold from Benguet, Lepanto, Surigao and Misamis has been found largely in small seams or stringers in quartz, although true veins have been found in all of these districts save the last. The most promising veins from Mambulao and Paracale are reported to be contact veins between gneiss and diorite. The best-defined veins appear to be entirely in the older crystalline rocks; those of the Camarines and Masbate notably so. Assay values of many veins sampled throughout the islands by prospectors and miners vary between a few cents to several hundred dollars to the ton. As it is not known by what method the samples were taken, a table of assay returns is not presented here. Suffice it to state that from present knowledge there are well-defined veins, of sufficient width and assay value, so far sampled in Lepanto, Benguet, the Camarines, and Masbate, to justify extensive development work, and that such work is now in prospect of performance upon claims in these districts.

The above notes apply to placer or free-milling gold. There are deposits of low-grade, free-milling, and partially or wholly refractory ores in Lepanto and Benguet that have not yet received the investigation they deserve. Miners and prospectors have devoted their energies during the past four years entirely to the most promising fields so far found.

It is believed, from present information, that there is a future for hydraulic and dredge alluvial mining in the Camarines, in Masbate and in Mindanao, and for vein mining in Lepanto, Benguet, the Camarines, Masbate and Mindanao. Later and more detailed information must necessarily depend upon development work now in progress, and it is hoped that future work will extend rather than diminish the list given above.

The majority of Philippine gold ores now being worked are crushing and amalgamating ores; a few must be smelted, and cyanide plants will probably be erected for many of the works. Associated with the gold in some of the Camarines ores are the sulphides of iron and copper in the form of pyrites, zinc in sphalerite, and crocoite, the chromate of lead. Gold is also found associated with the sulphides, arsenides and antimonides of copper in the mines of Lepanto, district of Mancayan.

Copper has been reported from the islands of Luzon, Mindoro, Masbate, Panay and Mindanao; but the only important deposits so far known are those of the famous district of Mancayan, Lepanto province, in northern Luzon. The report of copper in the island of Balabac, the Paragua group, could not be verified by the mining engineer of this Bureau in a recent visit by him to that island; and Abella could find no evidence of valuable copper deposits among those reported from Panay. Samples of native copper, said to have been brought from Masbate, have been shown to the present chief of the bureau, but no information of value was obtained from the prospector exhibiting them. The copper deposits so far known in Mindoro are all of copper pyrite, apparently of limited extent; and of the ores reported from Mindanao, nothing is known. There are veins of chalcopyrite in the Camarines and in Bontoc, but they have not yet been prospected or developed, and data concerning them are not available at the present time.

The important deposits of Lepanto are at Suyoc and Mancayan, within a few miles of each other, in the southern part of the province. These veins carry the sulphides, arsenides and antimonides of copper, among them enargite, and its variety first identified here, luzonite. From samples obtained in the breasts of old workings at Mancayan, it has been estimated that the ores average 16% in copper, with a gangue of quartz. There is much of this ore in sight, and it is believed that in quantity and quality of copper, Mancayan is one of the most inviting of the mineral assets of the Philippines. The deposits have been prospected, staked and recorded, and the owners of claims are sanguine of success.

The working and smelting of the ores of Mancayan were carried on by the Igorrotes of Lepanto before the Spanish conquest. The metallurgical treatment was so ingenious, complicated and effective, that it unquestionably points back to an older contact with civilization, probably with the Chinese from the north. The mining, of course, has been most avaricious, and the old workings will require thorough timbering before modern methods of exploitation can be employed. Of the many interesting features of the Igorrote metallurgy and of the first Spanish invasion of Mancayan nothing will be given here, save that the natives made such excellent implements and utensils of copper, exporting them to the extent of 200 tons annually, that the attention of the Spanish was attracted; and that after an invasion with an armed force as an escort, amicable arrangements were finally made between the Canabro-Filipino Mining Company and the Igorrotes, by which mines were opened and worked under the distinguished Spanish inspector of mines, José Maria Santos, and that from two mines for the 10 years following 1864 about 1,100 tons of copper were annually produced. Upon the death of Santos, who made a success of the Mancayan, mining was stopped.

It is hoped that as a result of field-work, recently completed in Lepanto by a party from the bureau under A. J. Eveland, geologist, a fairly complete bulletin upon this interesting subject may soon be in press.

Capt. McCaskey's conclusions are summed up as follows: "Although some of the common metals are absent, or not yet discovered, in the Philippines, there remain sufficient mineral resources to form the basis of an important industry. The stage at present is that of investigation and development; it is hoped, however, that we shall rapidly approach the period of production.

"Further development of the mineral resources of these islands is necessary to growth of the industries involved. Prospecting has been done upon almost every island of the group, to the great credit of the pioneers who have laboriously blazed the trail; but capital for the development of prospects has been difficult to secure. It is hoped that the definite policy concerning the future of these islands, so earnestly desired by capitalists as a pre-requisite to permanenet investment, may soon be determined by the people of the United States, to the end that the Philippines may enter upon an undisturbed and prosperous career."

REVIEW

"Pelton Water Wheels," The Pelton Water Wheel Company, San Francisco and New York City; 10th edition.

This is a magnificently illustrated catalogue of the Pelton system of power, and explains to the uninitiated in water wheel practice, as concisely as possible, the primary principles and general functions of the Pelton Wheel; also indicates its ready application to a variety of conditions.

GRAVITY WATER SUPPLY FOR THE CITY OF MANILA, P. I.

(J. F. CASE, C. E., Chief Engineer.)

According to the specifications which are to govern the construction of the Gravity Water Supply for the City of Manila (see advertisement in another section of this paper), the work called for will preferably be let as a whole, but may be let separately in the following divisions if deemed advantageous to the municipality—

Dam and head works, one contract.

Furnishing steel plates and rivets, one contract.

Manufacture and laying of steel pipes, one contract.

Tunnel and conduit, one contract.

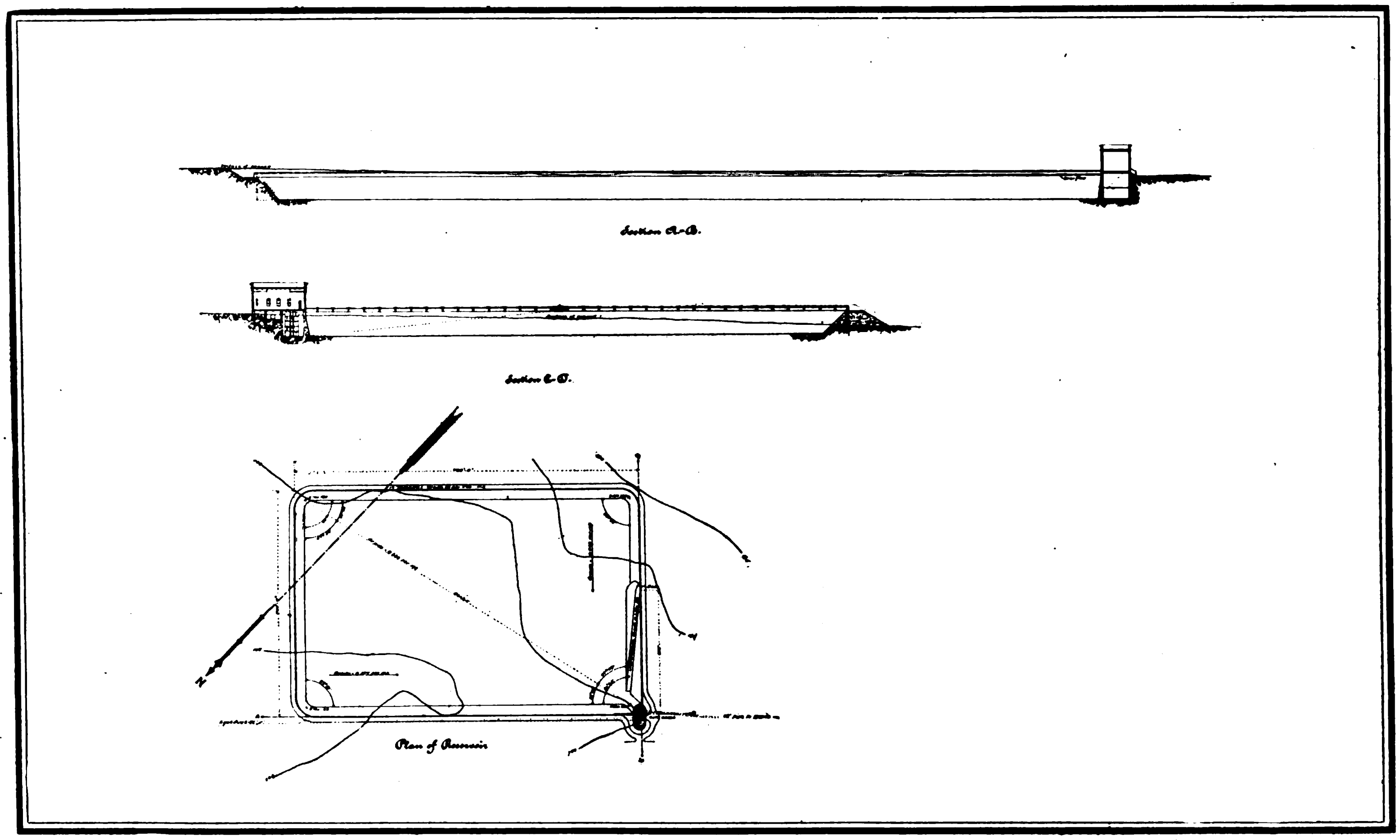
Reservoir and gatehouse, one contract.

All bids will be compared on the basis of the engineer's estimate of quantities of work to be done, which, subject to change, is as herewith shown:—

MANUFACTURING AND LAYING STEEL PIPE.

18.	Earth excavation and refilling...... cubic yards	58,500
19.	Loose-rock excavation and refilling.. cubic yards	1,000
20.	Solid-rock excavation and refilling.... cubic yards	9,000
21.	Adobe-stone excavation and refilling cubic yards	7,500
22.	Manufacturing, laying, transporting and testing 42-inch steel pipe........ lineal feet	55,800
23.	Furnishing, transporting, laying, and testing 36-inch cast-iron pipe under the Mariquina River....lineal feet....	450
24	Furnishing and laying 6-inch waste pipe. No 14 Birmingham wire gauge..........................lineal feet....	1,000
25.	Portland cement concrete masonry 1:2½:5....cubic yards	200
26.	Portland cement concrete masonry composed of 1 part cement, 4 parts sand, 10 parts broken stone, cubic yards	150

Mariquina River, about 3 miles above the town of Montalbon, Province of Rizal, and about 16 miles northeast of Manila. The location and general character of the work are shown on an accompanying plan. The dam is to be built of rubble concrete masonry resting upon the solid rock. The engineer calls special attention to the uncertainly as to the exact quantity of the rock to be excavated in preparing the foundations for the dam, since it will depend upon the character of the rock and the number of seams and other defects, which can not be determined in advance. The quantity of masonry to be built will also vary from that estimated for the same reason. In estimating it has been assumed that the average depth of excavation will not exceed 20 ft., but an increase or decrease in depth will not be regarded as ground for an increase or decrease



GRAVITY WATER SUPPLY.—PLAN AND ELEVATION OF RESERVOIR

DAM.

Item 1.	Earth excavation, Class A........cubic yards	1,000
2.	Earth excavation, Class B.........cubic yards	500
3.	Loose-rock excavation, Class C.......... cubic yards	1,600
4.	Loose-rock excavation, Class D.......... cubic yards	400
5.	Solid-rock excavation, Class E.......... cubic yards	11,000
6.	Solid-rock excavation, Class F.......... cubic yards	500
7.	Solid-rock excavation, without blasting, Class G..........cubic yards	500
8.	Rubble concrete masonry..........cubic yards	23,000
9.	Facework of rubble concrete masonry square yards	3,600
10.	Riprap..............................cubic yards	1,200
11.	Portland cement concrete masonry, 1:2½:5..........................cubic yards	300
*12.	Concrete gate well lining............cubic yards	206
*13.	Brick masonry gate well lining.......... cubic yards	206
14.	Gatehouse at dam, one complete	
15.	Hauling, caring for, and placing iron and other metal work..............tons	45

FURNISHING STEEL PLATES AND RIVETS

16.	Steel plates..............................pounds	5,300,000
17.	Steel rivets..............................do.........	155,000

TUNNEL.

27.	Earth excavation in open trench........ cubic yards	1,050
28.	Borrowed earth for embankment...... cubic yards	16,000
29.	Rock excavation in open trench........ cubic yards	2,400
30.	Tunnel excavation............cubic yards	17,500
31.	Concrete lining for tunnel...... ....cubic yards	3,500
32.	Plaster coat on unlined sections........ square yards	37,500
33.	Concrete masonry for chambers, culverts, etc.........................cubic yards	270

RESERVOIR AND GATEHOUSE.

34.	Earth excavation............cubic yards	29,000
35.	Rock excavation.............cubic yards	235,000
36.	Plaster coat for reservoir........square yards	43,500
37.	Concrete masonry lining............cubic yards	200
38.	Concrete masonry in parapet walls.. cubic yards	325
39.	Concrete masonry in gate chambers and core walls..........cubic yards....	1,650
40.	Gatehouse at reservoir, one complete.	
41.	Hauling, caring for, and building into place iron and other metal work in gatehouse and reservoir....tons	41

*Items 12 and 13 are optional with the engineer.

DAM.—The dam is to be built across the

in prices for rock excavation nor for masonry, or in time allowed for completion of work. The dam will have a length of about 400 ft. on the crest, and its maximum height above the bed of the stream is approximately 75 ft. The central portion, 160 ft. in width, will be built as an overflow or wasteweir section, with its crest 15 ft. lower than the remainder of the dam. On the south side of the overflow a gate chamber is to be constructed, serving an inlet well, sluiceway and supply pipe. The sluiceway and supply pipe are to extend through the dam. Owing to the rainfall during the months from June to November, inclusive, and the consequent stage of the river, it is expected that a greater part of the work of constructing the dam will be confined to the dry season, from December to May, inclusive. In connection with the construction of the dam the contractor will be required to construct and maintain such temporary dams, flumes, dikes, etc., as shall be needed to protect the work and control the water of the stream during construction, and shall do all draining and pumping necessary for keeping the work free from water,

and shall, on completion of the work, remove all temporary or protecting works as shall be ordered by the engineer. The contractor will receive no payment for this temporary and protecting work.

EXCAVATION.—In making the excavation required to prepare the foundation for the dam, etc., the contractor will be required to prepare and construct the bed for all pipes, conduits, etc., for a distance of 100 ft. below the toe of the dam. He will first excavate in the bottom of the gorge with a view to uncovering the rock and creating the plane upon which the dam shall rest. The work will be so staked out that a slope of 1½ horizontal to 1 vertical in earth excavation will reach the rock 15 ft. upstream from the heel or upstream face of the dam, and 10 ft. downstream from the toe or downstream face. All rock excavation will be staked out with a slope of 1 horizontal to 10 vertical. Wherever a core wall is necessary a trench therefor will be excavated and if it be necessary to excavate to greater depths than contemplated, all materials below the plane of 158 ft., as shown on the plans and profiles, which plane is approximately 20 ft. below the bed of the stream at the upstream face of the dam, will be classed as "deeper excavation," and be paid for at stipulated prices. Excavation will be classified for estimate and payment as follows:—

Class A: Includes earth, gravel, sand, loam, or stones not exceeding 1 cub. ft. in volume above the plane of 158 ft.

Class B: Same materials as Class A, but below the plane of 158 ft.

Class C: Loose rock and boulders when lying above the plane of 158 ft., not less than 1 cub. ft. nor more than 6 cub. ft. in volume when in masses, but when isolated or scattered in small quantities they will be classed as earth.

Class D: Same material as Class C, but lying below the plane of 158 ft.

Class E: Solid rock in place and boulders more than 6 cub. ft. lying above the plane of 158 ft.

Class F: Same materials as Class E, but lying below the plane of 158 ft.

Class G: Solid rock, when directed by the engineer, will be removed without blasting. This class will only occur in the bottom of the excavation or where there is danger of loosening large masses of adjoining rock. The rock to be excavated is a hard, compact limestone, as far as can be determined.

All trenches and other excavations outside of finished lines of masonry will be refilled with selected materials, and, whenever in the opinion of the engineer it shall be necessary to protect refilled sections or any embankments from the action of the water, the contractor will be required, without extra charge therefor, to deposit suitable rock as a layer of riprap upon the surfaces so needing protection. Riprap will be in sizes from quarry spalls up to stones of not more than one cubic foot in volume and will be hand placed to such thickness as shall be directed.

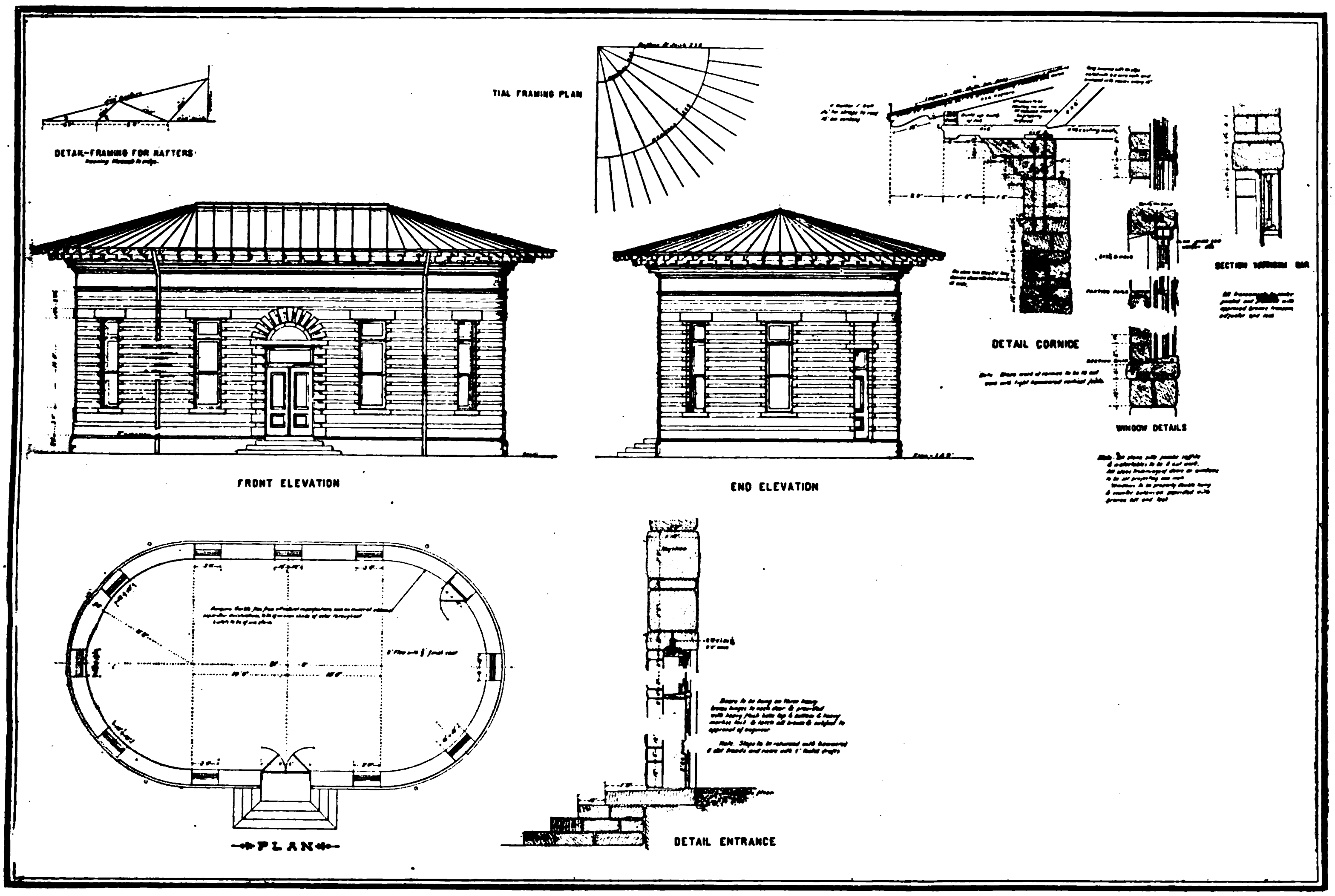
CEMENT.—Only the best grade of imported hydraulic Portland cement will be used in the construction and must conform in all respects to the requirements of the United States Army engineers' specifications for cement. The sand used for concrete, mortar, etc., may be taken from the bed of the Mariquina River adjoining the site of the dam and upstream therefrom, and the gravel may also be obtained at or near the site of the work. Cement will be measured as if compacted, so that 375 lbs. of cement will be considered to have a volume of 3.6 cub. ft., and sand and stone or gravel will be measured when not compacted more closely than by throwing them in the usual way into a barrel or box.

RUBBLE CONCRETE.—The hearting of the entire dam will be built of so-called rubble concrete. It is intended that the entire mass shall contain from 40 to 50 per cent, or even more, of large stone. The contractor will be required to furnish the plant for and to handle stone up to five tons in weight, and will not be limited as to stones of larger size.

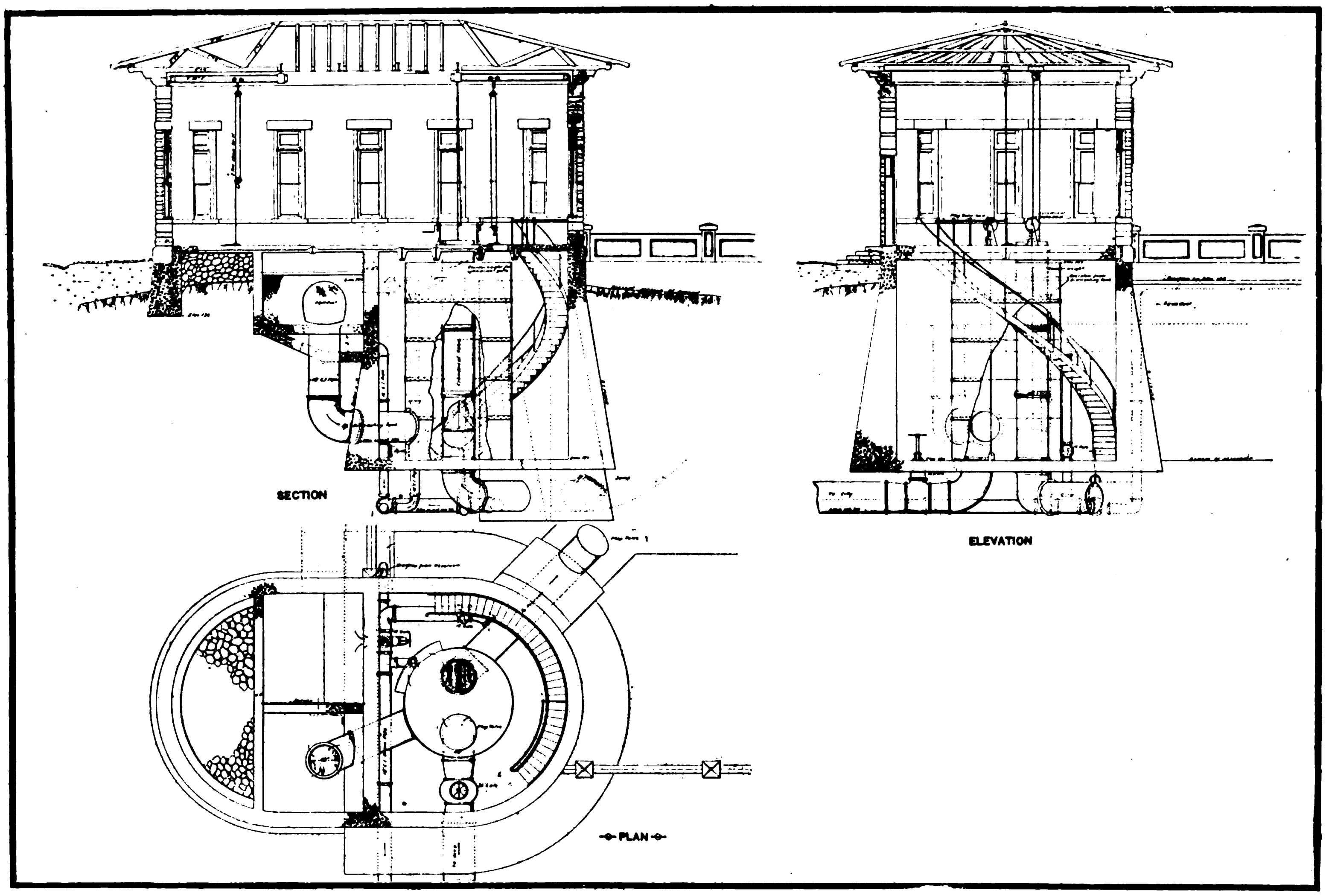
The upstream, top, and downstream faces of the dam will be built of coursed-rubble-laid with stone dressed to make ¾ in. joints, for at least 4 in. in depth. After laying, these joints will be raked out to a depth of 2 in. and pointed with mortar consisting of 1 part cement and 1 part sand. Special care will be taken to secure thorough bonding between the hearting and facing, and a sufficient quantity of headers not less than 4 ft. long will be used. The top of the overflow section will be laid and rough-dressed to conform as nearly as possible to the curve shown on the plans. All facework will be paid for by the sq. yd. of superficial area in addition to the price paid per cub. yd. for rubble concrete masonry.

GATEHOUSE, INLETS, ETC.—The gatehouse will be built of coursed-rubble masonry and will be considered as being founded on elevation 255 ft. All work below this elevation will be included in payments for the dam and the work above this elevation will be included in the gatehouse, which latter structure will be paid for as a lump-sum price for the structure complete. Inlets, gate wells, etc., will be built of concrete or brickwork. If of concrete, it will be composed of 1 part cement, 2 parts sand, and 4 parts broken stone, and will be neatly and thoroughly plastered after removing the forms with mortar composed of 1 part cement and 1 part sand. If of brickwork, the brick will be of the best quality of hard-burned bricks, and will be laid with a mortar composed of 1 part of cement and 1 part of sand.

IRONWORK.—The City of Manila will furnish all iron and other metal work required for permanent use in the dam and its appurtenances, and the principal items of iron or metal work to be placed by the contractor are pipes through main dam; pipes, valves, and gates of various sizes in gate chambers; stop plank and screen grooves; pipes for floating gauges, thimbles, or collars; iron-frame gratings; flashboard standards; iron boxes over wells in gatehouse; columns and beams in gatehouse; stairs and ladders in gatehouse; anchors for coping stones, and metal roofing.



GRAVITY WATER SUPPLY.—GATEHOUSE AT RESERVOIR.



GRAVITY WATER SUPPLY.—GATECHAMBER AT RESERVOIR.

STEEL PIPE.—Plates will be of soft open-hearth steel and will not contain more than 0.05 per cent phosphorus, 0.05 per cent sulphur, 0.05 per cent silica, and 0.05 per cent of manganese. They will have a tensile strength of 52,000 lbs. or more and not more than 62,000 lbs. per sq. in.; an elongation of not less than 25 per cent in 8 in., with a reduction of cross-sectional area of not less than 50 per cent. at fracture, which will be silky in character. All rivets will be of soft open-hearth steel, having a tensile strength of not less that 50,000 lbs. nor more than 58,000 lbs. per sq. in.; an elongation of not less than 28 per cent in 8 in., with reduction of cross-sectional area at the fracture of not less than 50 per cent.

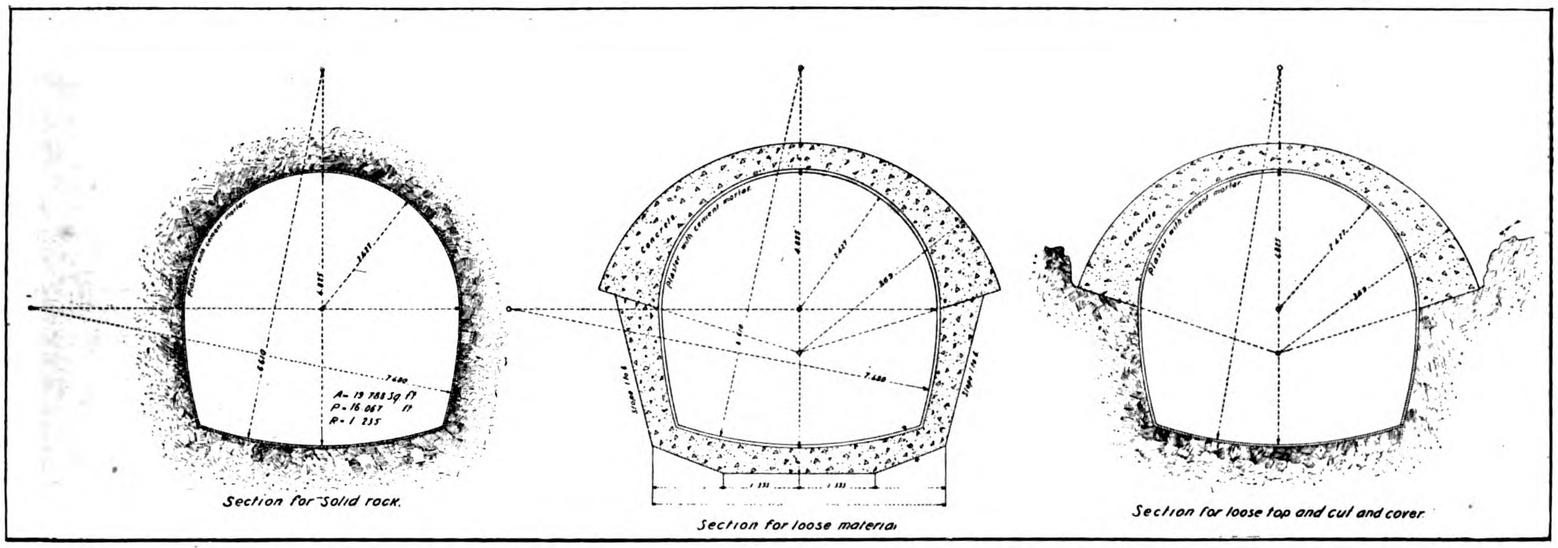
DESCRIPTION OF PIPE.—The length of the pipe is approximately 10.6 miles and its diameter 42 in. on inside of smaller courses. The total weight, exclusive of rivets and coating, is estimated at 5,300,000 lbs. The pipe will be cylindrical, and will be composed of alternate large and small courses, the smaller one fitting at each end into the larger. Each course will be made from one plate and the pipe will be made up in lengths of 4 courses, but the number of courses may be increased to 6 if deemed advisable by the engineer. All plates will be 60 in. or more in width. Longitudinal seams will be double riveted and circular seams single riveted excepting at curves, where circular seams will be double riveted at the beveled joints when ordered by the engineer. At each section of longitudinal or circular seams plates will be scarfed or hammered to thin edges. The dimensions of the pipe are as follows:—

Inside diameter of small courses, 42 in.
Thickness of sheets, 0.203 in.
Diameter of rivets, 7-16 in.
Diameter of rivet holes, 8-16 in.
Length of seam rivets, 1 3-16 in.
Length of lap rivets, 1 5-16 in.
Distance from center of nearest rivets to edge of plate on all seams, 0.75 in.
Distance between rows of rivets on double-riveted seams, 0.875 in.
Approximate average pitch in double-riveted straight seams, 1.75 in.
Approximate average pitch in single-riveted round seams, 1.40 in.

COATING.—After the pipe has been made up in courses and tested it shall be thoroughly dried and cleaned and will then be subjected to a bath prepared and applied in the following manner. At least two iron tanks of suitable size placed over brick furnaces shall be filled nearly full with blocks of pure-grade refined asphaltum, which shall be melted and fluxed with a sufficient quantity of coal tar or natural liquid asphalt equal to that known as "Maltha," L-grade asphalt, to give the proper consistency to the mixture when at the temperature required. The mixture shall then be heated while being frequently stirred until the entire charge becomes a fluid. The temper of the mixture shall then be tested by immersing in the boiling fluid a piece of three-eighths-inch plate not less than 6 inches square, which must be allowed to remain therein at least ten minutes. It will then be removed and immediately cooled in ice-cold water. If the coating should then crack or fly off upon striking the plate with a hammer, it will determine that the coating is too brittle. If the coating does not fly off under the hammer test, but softens at a temperature of 100° F., it will determine that the coating is too soft, and either more asphaltum or more flux must be added until such temper of the mixture is secured as will withstand the hammer test and also remain sufficiently hard and firm at a temperature of 100° F. The pipe shall then be completely submerged in a tank in which the mixture is heated to a temperature of from 350° to 400° F. and left therein at least twenty minutes, or long enough for the iron to attain the temperature of the mixture. It shall then be withdrawn, the coating allowed to stiffen for about fifteen minutes and then immersed a short time in the second tank to thicken the coat. The temperature of the mixture in the second tank shall be from 225° to 250° F. Suitable appliances shall be furnished by the contractor at his own expense to lower, raise, and revolve pipes in the bath. The thickness of the coating shall be such as the engineer may deem necessary to effectually protect the metal. The materials for the mixture, appliances and methods of boiling, melting, or applying and testing the coating shall be subject to the approval of the engineer in all cases. Fresh materials shall be added to the bath from time to time in the right proportions to keep the mixture of the proper consistency, and the tank must be occasionally emptied of its contents and refilled with fresh material when ordered by the engineer. In case that, from any cause, the coating on any length is found to be defective, it must be renewed, and, should the defect be from brittleness, scaling, or improper composition or application of the coating, it must be scraped off entirely outside and inside and another coating applied.

Bidders are requested to make a supplementary proposal for coating the pipe by what is known as the Sabin process, manufactured and controlled by Messrs. Edward Smith & Co., 45 Broadway, New York City. If the contractor shall present satisfactory proof of the efficiency of some other coating, the engineer may approve of the same in writing, and it may then be substituted.

SPECIALS.—The plans show the alignment of the pipe lines, and profiles show the elevations of the pipes at various points. Pipe will be made of such dimensions as to fit the lines thus shown. To attain this end a sufficient number of courses will be cut and punched on the bevel to make the required curves at angle points in the plan or profile without giving

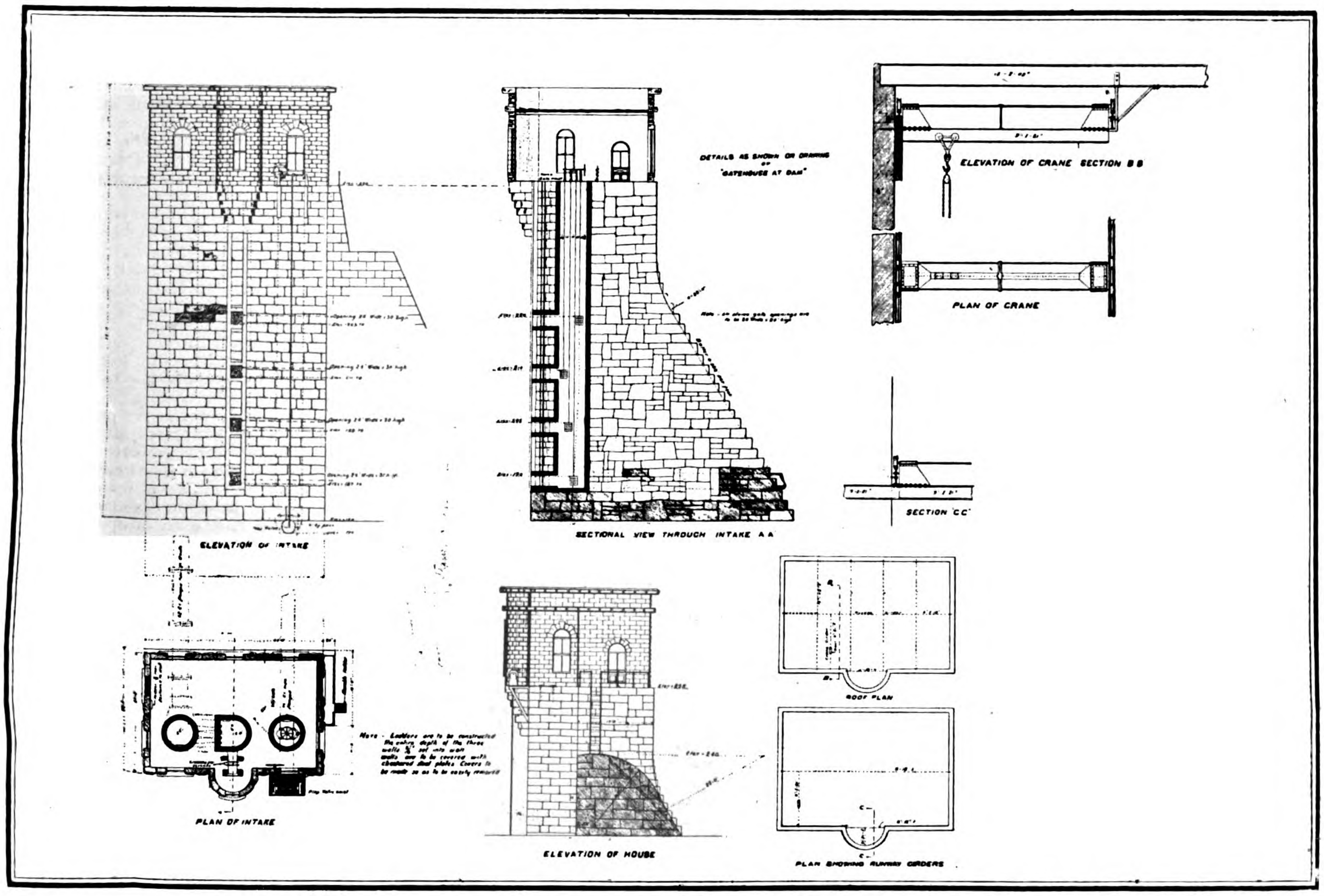


GRAVITY WATER SUPPLY.—SECTION OF THE VIADUCT.

unfair holes for the rivets and without forcing at the field joints. Bends will be braced on the outside with masonry or concrete where-ever the engineer so orders. Manholes, air valves and blow-offs will be connected with the pipes by means of steel rings 3 in. wide and ¼ in. thick placed on the inside of the larger courses and riveted to the steel of the pipes and flanges of the fittings by means of hot rivets of suitable dimensions.

LAYING PIPES.—On soft or yielding ground leaded sleeve joints will be used for connecting the extremities of two lengths of pipe. Connection will be made at the junction of two large courses by means of an inside sleeve riveted on the outside of one course and projecting into the inside of the other, and an outside sleeve over the joint of wrought iron, leaving an annular space to be filled and calked with lead. At each syphon chamber the end of the steel pipe line will be connected to the chamber by being inserted into the bell of a casting set into the wall of the chamber and making a leaded joint. The end of the pipe which is to fill the bell of the casting will be reenforced with a ring of steel plate. These reenforced rings will be thoroughly calked at both ends. The whole space between the pipe and the bell of the casting will be filled nearly to its full depth with lead which lead will be very thoroughly calked.

Pipe will be laid in sections of convenient length and each section of pipe, when it shall have been riveted, calked, and cleaned, will be tested to a hydraulic pressure of 75 lbs. per sq. in., at least. The line will be provided with manholes, blow-off connections, and connections for air valves. Manholes will have openings approximately 14 x 16 in. For the blow-offs suitable curved pipes having flanges to which valves can be bolted, will be riveted to the pipes. All manhole frames and covers, blow-offs and air-valve connections, and other castings to be riveted to the pipes will be of cast steel. Each blow-off will be furnished with a sufficient length of 6 in. steel waste pipe, No. 14 Birmingham wire gauge, to conduct the waste water to a suitable ravine or water course. Each blow-off, manhole, and air value will also be provided with a concrete or brick well, laid in cement and covered with a cast-iron manhole cover and the City of Manila will furnish the air valves and fittings, and valves, frames and covers for valve chambers, and additional special castings required for the blow-offs. Concrete foundations of approved dimensions wille placed bunder blow-off castings.



GRAVITY WATER SUPPLY.—GATECHAMBER AT DAM.

MARIQUINA RIVER CROSSING.—The pipe line will be carried under the bed of the Mariquina River near the town of San Mateo by means of a cast-iron pipe, 36 in. in diameter, of the following weights and dimensions:—

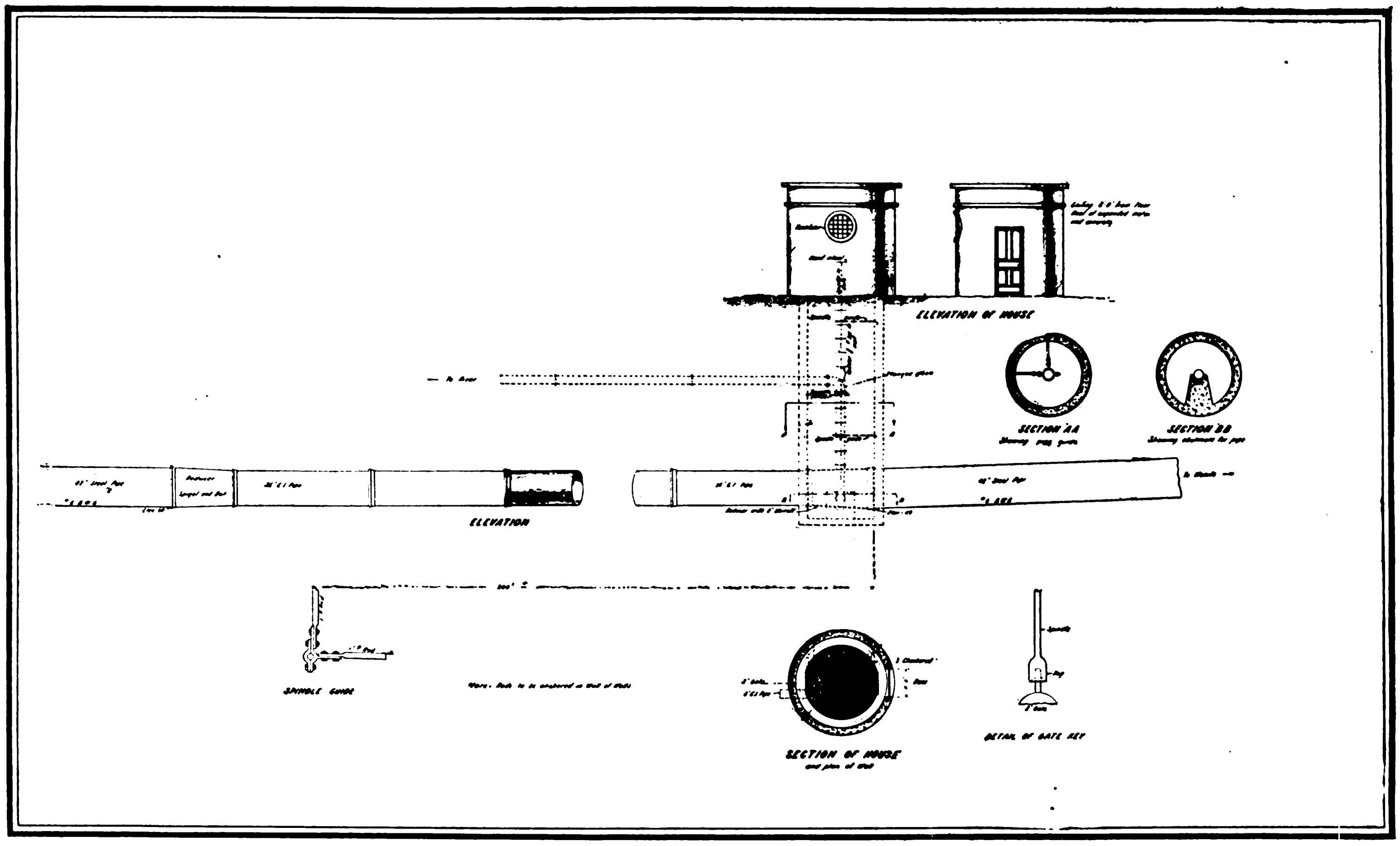
Internal diameter, 36 in.
Thickness of barrel, 1½ in.
Thickness of lead joints, 7-16 in. to ½ in.
Depth of hub, 4½ in.
Approximate weight of pipe 12 ft. in length 5,328 lbs.

The river during the dry season dwindles to small proportions, and it is the intention that this pipe shall be laid during the time of extreme low water. The length of this cast-iron pipe will be approximately 450 ft. between the locations of the gatehouses at each end. On the line of the pipe the trench will be dug, over which the water of the river will be carried by means of a flume. Pipe will be in lengths of 12 ft. from the bottom of the hub to the end of the spigot.

TUNNEL AND CONDUIT.—From the reservoir gatehouse at station No. 48 to station No. 305, excepting the short pipe siphons shown on the profile, there will be constructed an aqueduct in tunnel and open cut. Borings have been made along the line of the work and it is believed that the entire work will be in the soft rock locally known as *adobe* stone. According to the firmness of the material, the tunnel will be classed as unlined, partly lined, and full lined. In unlined sections *adobe* rock is expected to be of sufficient strength without reenforcement. Partly lined sections will be used when any portion of the adjoining rock is loose or unfirm. Full-lined sections will be used whenever in the judgment of the engineer the walls or arch will not stand unsupported. The contractor will trim the tunnel to the sizes shown on the plans, and on unlined sections or portions of sections he will score the bottoms, sides, and arch to a depth of ¼ of an in., with diagonal lines crossing in both directions, spaced 2½ in. between centers, to receive the plaster coat. Various sections of the aqueduct in open trench and embankment are shown in the plans. The sections to be built may vary somewhat, however, from those illustrated. Embankments and terminal chambers are also provided for. All iron and other metal required in the permanent work will be furnished by the City of Manila.

RESERVOIR AND GATEHOUSE.—The site of this work is about 1 mile easterly from the present Deposito and 1½ miles outside the limits of the City of Manila, and the same distance from water transportation at San Juan River. The work to be done consists in excavating earth and rock necessary for the construction of the reservoir and its appurtenances in conformity with the plans and specifications, and

(*Continued on page 95.*)



GRAVITY WATER SUPPLY.—MARIQUINA RIVER CROSSING.

HONGKONG AND SHANGHAI BANKING CORPORATION.

The ordinary half yearly meeting of the shareholders of the Hongkong and Shanghai Banking Corporation was held on the third Saturday of August at the city hall, Hongkong. Mr. H. A. W. Slade presided, and there were also present Messrs. A. Haupt, deputy chairman; C. W. Dickson, E. Goetz, G. H. Medhurst, A. J. Raymond, F. Salinger, H. Schubart, E. Shellim, N. A. Siebs, R. Shewan, court of directors; J. R. M. Smith, chief manager; C. W. May, chief accountant; Gershom Stewart, H. M. H. Nemazee, J. C. Peter, A. V. Apcar, N. J. Stabb, O. von der Heyde, R. R. Hynd, C. J. Gonsalves, J. A. Chinoy, H. N. Mody, E. Georg, G. M. Bain, D. D. Gazdar, J. Orange, J. A. Jupp. W. H. Potts, W. H. Gaskell, A. G. Wood, W. A. C. Cruickshank, F. D. Goddard, W. H. Purcell, W. H. Wickham, Dr. Noble, W. J. Saunders, P. C. Potts, J. Barton, J. R. Michael, S. J. Michael, G. L. Tomlin, E. S. Kadoorie, Wong Leung Him, Ho Fook, Lo Cheung Shui and Ho Kom Tong.

After the reading of the notice convening the meeting by the chief manager, the chairman said:

"Gentlemen.—It gives your directors great pleasure to come before you with another good result of six months' working of the bank. I feel sure that the report which I have just read will be considered satisfactory and I trust the distribution of profits which we recommend will also receive your approval. From the statement of accounts which has been in your hands for some time, you will have seen that, in addition to placing $5 lacs to the silver reserve, raising that fund to $8,500,000 and carrying forward some $2 lacs in excess of last half year, we propose, on this occasion, to pay a dividend of £1. 15/- per share, being an increase of 5/- on the dividend which you have regularly received for the past six and a half years. At first sight 5/- per share does not seem a large increase, but it amounts to £40,000 a year, and in percentage you will find that at present exchange it represents fully 4 per cent per annum on the capital, which I think you will admit is a very substantial addition to our dividend. Your directors fully recognize, as I am sure you must all do, the inadvisability of raising the dividend unless there are reasonable grounds for feeling confident of being able to maintain it. The proposal has therefore not been made without due consideration and only after careful observation of the steadily increasing earning power exhibited by the various branches of the bank not only in the Far East, but also in other parts of the world where we are established. But though we feel justified in thinking that the time has come for shareholders to receive a higher dividend, we are also alive to the necessity of ensuring that the bank shall be prepared to take advantage of the increased opportunities certain to accompany the great impetus to enterprise in China which is expected to follow the close of the war, and we therefore fully realize the prudence of continuing to add to our reserves. This is the surest way of maintaining the strong position in which the bank at present stands, and your directors have no intention of departing from the general line of policy in that respect which has been pursued with so much success in the past and of which we

are to-day reaping the benefit. Turning now to the balance sheet and comparing it with that of 31st December last, you will notice that the total figures are considerably higher. This is to a large extent accounted for by the increase of some £2.500,000 in the gold current accounts, due chiefly to the temporary deposit of proceeds of loans recently floated. There is no appreciable change in gold fixed deposits. Silver current accounts show an increase of $5,300,000 and silver deposits are also a little higher. Bills payable have increased by $5,000,000. There is only a slight difference in our note circulation, but compared with a year ago it has gone up about $11 lacs. On the other side of the account coin lodged with the government against the excess note issue remains unchanged at $8.500,000, but cash, and bullion in hand and in transit, amount to $49,336,683.16 against $43,204,418 57. Our holdings of Indian Government rupee paper and consols, colonial and other securities, have both been slightly increased; bills discounted, loans and credits stand at $104 214,416.69 against $85,601,394 98 in December and bills receivable are nearly $12,000,000 more than last half year. Far Eastern commerce has pursued a comparatively even course throughout the past half year considering the importance of the political events which have marked the period. The effect of the war upon trade has not changed in any striking manner since we last met. Things seem to have adjusted themselves fairly comfortably to the temporary conditions. We have certainly witnessed a marked depression of trade and contraction of native credit in the South of China. This however has been mainly due to local causes, which we may hope before long to see disappear; but, viewed as a whole, the foreign trade of China continues to expand while that of Japan has shown remarkable progress, notwithstanding the continuance of hostilities. In the happy event of peace resulting from the conference now being held in America, there is good reason for anticipating a general revival of trade throughout the Far East and we may look forward with confidence to the future."

There were no questions and the chairman proposed the adoption of the report and accounts.

Mr. Orange: "Gentlemen—I feel sure the report and accounts placed before us can not fail to be satisfactory to the shareholders. The increase in dividend will be welcome, especially in view of the remarks of the chairman that this would not have been done without the prospect of being continued. We all trust that the close of the long war is near, bringing about a more secure feeling in trade and business generally. I have much pleasure in seconding the adoption of the report and accounts." (Carried.)

Mr. Saunders proposed and Mr. Barton seconded the confirmation of the appointment of Messrs. C. W. Dickson, G. H. Medhurst, and F. Salinger to the court of directors. (Carried.)

Mr. G. Murray Bain proposed, and Mr. J. A. Jupp seconded, the reelection of Mr. W. Hutton Potts and Mr. A. G. Wood as auditors. (Carried.)

Mr. Cruickshank: I propose a very hearty vote of thanks to the court of directors, the chief manager, under-managers and staff, and congratulate them on the satisfactory working of the past six months (applause.) Gratifying as the results are, we must not overlook the fact that the very substantial rise in the value of the shares is due to the able management and care of our interests on the part of those who have borne the heat and brunt of the day during the past six months (applause).

The chairman having acknowledged, the meeting terminated.

EIGHTIETH REPORT

The eightieth report of the court of directors to the shareholders in connection with the above meeting, is as follows:—

To the Proprietors of the Hongkong and Shanghai Banking Corporation. Gentlemen.—The directors have now to submit to you a general statement of the affairs of the bank, and balance sheet for the half-year ending 30th June, 1905

The net profits for the period, including $1,493,408.75, balance brought forward from last account, after paying all charges, deducting interest paid and due, and making provision for bad and doubtful accounts, amount to $3,711,062.18.

The directors recommend the transfer of $500,000 from the profit and loss account to credit of the silver reserve fund, which fund will then stand at $8,500,000.

After making this transfer and deducting remuneration to directors there remains for appropriation $3,196.062 18, out of which the directors recommend the payment of a dividend of one pound and fifteen shillings sterling per share, which at 4/6 will absorb $622,222.22

The difference in exchange between 4/6, the rate at which the dividend is declared, and 1/10½, the rate of the day, amounts to $871,111 11.

The balance $1,702,728 85 to be carried to new profit and loss account.

Directors.—Mr H. E. Tomkins, the Honorable Mr. W. J. Gresson, and Mr E S. Whealler having resigned their seats on leaving the colony, the Honorable Mr. C W. Dickson, Mr, G. H. Medhurst, and Mr. F. Salinger have been invited to fill the vacancies; these appointments require confirmation at this meeting.

Mr. H. A. W Slade has been elected chairman for the remainder of the year in place of Mr Tomkins, and Mr A. Haupt succeeded Mr. Slade as deputy chairman.

Auditors.—The accounts have been audited by Mr W Hutton Potts and Mr. A G. Wood who offer themselves for re-election.—H. A. W. Slade, Chairman.

ABSTRACT OF ASSETS AND LIABILITIES, HONGKONG AND SHANGHAI BANKING CORPORATION

30th June, 1905.

Liabilities.

Paid-up capital,		$10.000.000 00
Sterling reserve fund,		10,000 000 00
Silver reserve fund,		8 000 000.00
Marine insurance account		250,000 00
Notes in circulation:—		
Authorized issue against securities deposited with the crown agents for the colonies,	$10,000,000 00	
Additional issue authorized by Hongkong Ordinance No. 19 of 1900, against coins lodged with the Hongkong Govt.,	5,993,312 00	
		15,993,312 00
Current accounts,—		
Silver,	$76,300,659 70	
Gold, £3,046,747 6s. 11d. =	64,849,013 58	
		141,149,673 28
Fixed deposits,—		
Silver,	$50.985,56 .11	
Gold, £5,267,426 8s. 11d. =	56,502,381.54	
		107,487,953.65
Bills payable (including drafts on London bankers, call loans and short sight drawings on London office against bills receivable and bullion shipments),		17.358,365 69
Profit and loss account,		3,711,062.18
Liability on bills of exchange rediscounted £4.579.869 2s. 9d of which £3,068,082 16s. 8d. have since run off.		
		$313,950,366.80

Assets.

Cash,		$44,223,818.50
Coin lodged with the Hongkong Government against note circulation in excess of $10,000,000		8,500,000.00
Bullion in hand and in transit,		5,112,864 66
Indian government rupee paper,		2,378,061 98
Consols, colonial and other securities,		11,576,537.66
Sterling reserve fund investments, viz.:—		
£570,000 2½ % consols at 85 (of which £250.000 lodged with the Bank of England as a special London reserve.)	£484,500	
£255,000 2 3/4 % national war loan, at 90	229,500	
£325,000 other sterling securities, written down to	286,000	
	£1.000.000	10,000,000 00
Bills discounted, loans and credits,		104,214,416 69
Bills receivable,		126.906.177 69
Bank premises,		1,038,489.62
		$313,950,366 80

GENERAL PROFIT AND LOSS ACCOUNT, HONGKONG AND SHANGHAI BANKING CORPORATION.

30th June, 1905.

Dr.

To amounts written off:—		
Remuneration to directors,	$	15,000.00
To dividend account:—		
£1.15/ per share on 80,000 shares=£140,000 @ 4/6	$622,222.22	
" Dividend adjustment a/c:— Difference in exchange between 4/6, the rate at which the dividend is declared, and 1/10½, the rate of the day,		871,111 11
" Transfer to silver reserve fund.		500,000 00
" Balance forward to next half-year,		1,702,728 85
		$3,711,062.18

Cr.

By balance of undivided profits, 31st Dec., 1904,	$1,493,408.75	
" amount of net profits for the six months ending 30th June, 1905, after making provisions for bad and doubtful debts, deducting all expenses and interest paid and due,	2,217,653.43	
		$3,711,062 18
		$3,711,062.18

STERLING RESERVE FUND.

To balance,	$10,000,000 00
By balance 31st Dec., 1904, (invested in sterling securities),	$10,000,000 00

SILVER RESERVE FUND

To balance,	$ 8,500,000.00
By balance 31st Dec., 5904,	$ 8,000 000 00
" transfer from profit and loss account,	500,000.00

J. R. M. Smith, Chief Manager.
C. W. May, Chief Accountant.

H. A W Slade,
A. Haupt,
E. Shellim, } Directors.

We have compared the above statement with the books, vouchers and securities at the head office, and with the returns from the various branches and agencies, and have found the same to be correct.

W. Hutton Potts,
A. G. Wood, } Auditors.

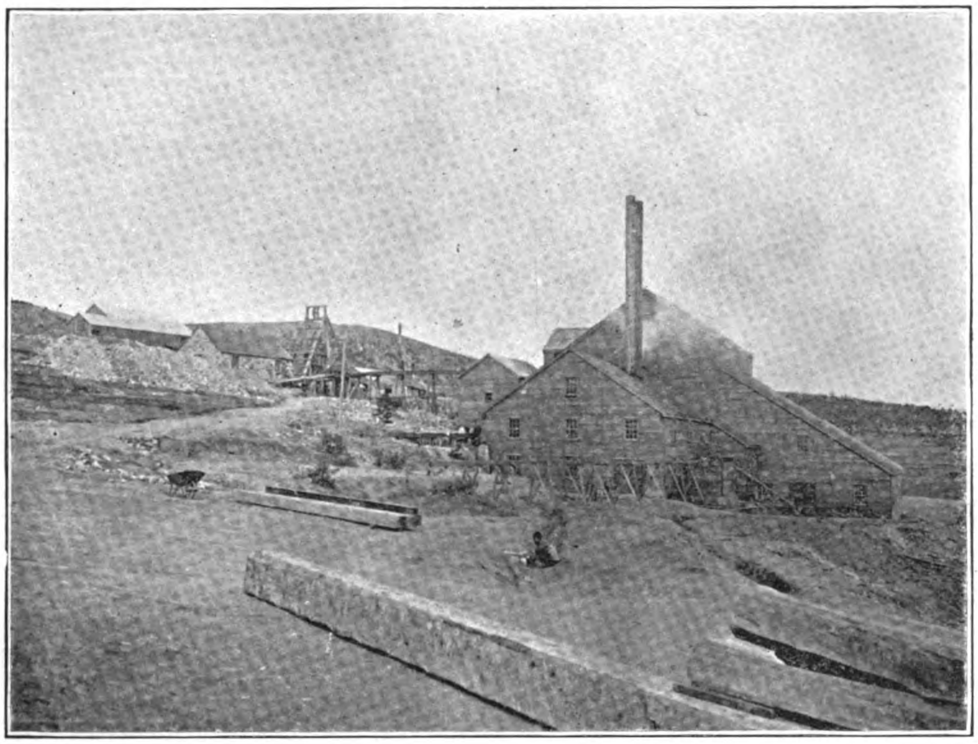
SIR THOMAS JACKSON, BART.

The splendid showing made by the court of directors of the Hongkong and Shanghai Banking Corporation, in its eightieth report to the shareholders, in which conservative and progressive financeering is the salient feature, should revive in the minds of all those interested in this great corporation the brilliant career of Sir Thomas Jackson, Bart., as chief manager of the bank in the days of its infancy. Sir Thomas is now residing in London, where he holds a high place in the councils of that office of the corporation, besides other important posi ions in the financial world. For more than twenty six years prior to 1902, when he returned to England, Sir Thomas guided the destinies of the bank as its chief manager in Hongkong. During this period he was the foremost financier of the Far East, and in addition he exhibited great public spirit in connection with the upbuilding of Hongkong Colony, the influence of which was felt everywhere along the China Coast. As chief manager of probably the strongest bank in the British Empire, with the single exception of the Bank of England, Sir Thomas was looked upon out in the Orient as the strongest man of his day. Besides his duties with the corporation he devoted much time and attention to the finances of the Chinese Empire, to whom the Peking officials turned when they found it necessary to negotiate loans for the public good. By his broad-minded policy Sir Thomas endeared himself to everybody with the result that today he commands the respect and highest esteem of all persons in the Orient. He is one of the very few great men who have been honored with a statue while still living, and the reproduction on the title page of this issue of The Far Eastern Review will give readers a good idea of the fine erect statue by Raggi (1904), which occupies a prominent site in Hongkong.

Sir Thomas was born in Ireland, June 4th, 1841, his father being David Jackson of Urker, Croosmaglen. He was educated at Morgan's School, Castle Knock, Ireland, and by private tutors, and in 1871 married Amelia Lydia Dare. He commenced banking in the Bank of Ireland, Belfast, in 1860, and came to the Agra Bank in the East in 1864. He joined the Hongkong and Shanghai Banking Corporation in 1866, and became its chief manager in 1876. He was knighted by Queen Victoria in 1899 for distinguished services to her government and was created a baronet (the first of his line), in 1902. His heir is Captain Dare Thomas Jackson, and his present residence is at Stansted House, Stansted, Essex. He is a prominent club man in London, holding membership in the City, Carleton, Thatched House and City of London clubs. Sir Thomas is also an enthusiastic golfer, in which recreation he takes great delight in spite of his advanced age and busy life.

DEVELOPMENT OF THE WEIHAIWEI (NORTH CHINA) GOLD MINES

Mining in China is yet in its infancy, and while there remains little doubt as to the extreme richness of the mineral resources of the empire, few mines have been developed by modern machinery, and results are still problematical. The development of the industry has been greatly retarded and impeded by the obstinacy of the Chinese officials, and their inborn tendency to "graft" or mulct anyone embarking in such an enterprise. The lease of Weihaiwei to Great Britain in 1898 opened up to the investor the prospect of developing the mineral resources of that district, free from the exactions of the native "squeezers," and it was not long before a company was formed in Shanghai for this purpose. The unavoidable trials and delays which overtake all new enterprises, were shared in this instance, also, and, coupled with conflicting reports and vague rumors of the soundness of the undertaking, caused a certain amount of disappointment amongst the stockholders. The company has, however, made considerable progress. It has its mill and machinery in place, and working, and, according to expert advice, profitable results will follow as the shaft is deepened. Four prospects were opened up and considerable work lost before they were abandoned as unprofitable, and new work commenced on parallel veins at Gin Tzu Ling, which have since been followed up. There are several old Chinese workings at Gin Tzu Ling mine, some of which are quite extensive, but the new company is the first to sink shafts. The English company has staked out roughly about three miles on the line of the Gin Tzu Ling reefs, and has purchased the surface workings of the natives at reasonable figures.



WEIHAIWEI MINES.—GENERAL VIEW OF THE MILL.
Whim House. Carpenters' Whim Shop. Whim to Mill.
Ore Dump. Ore Trestle.

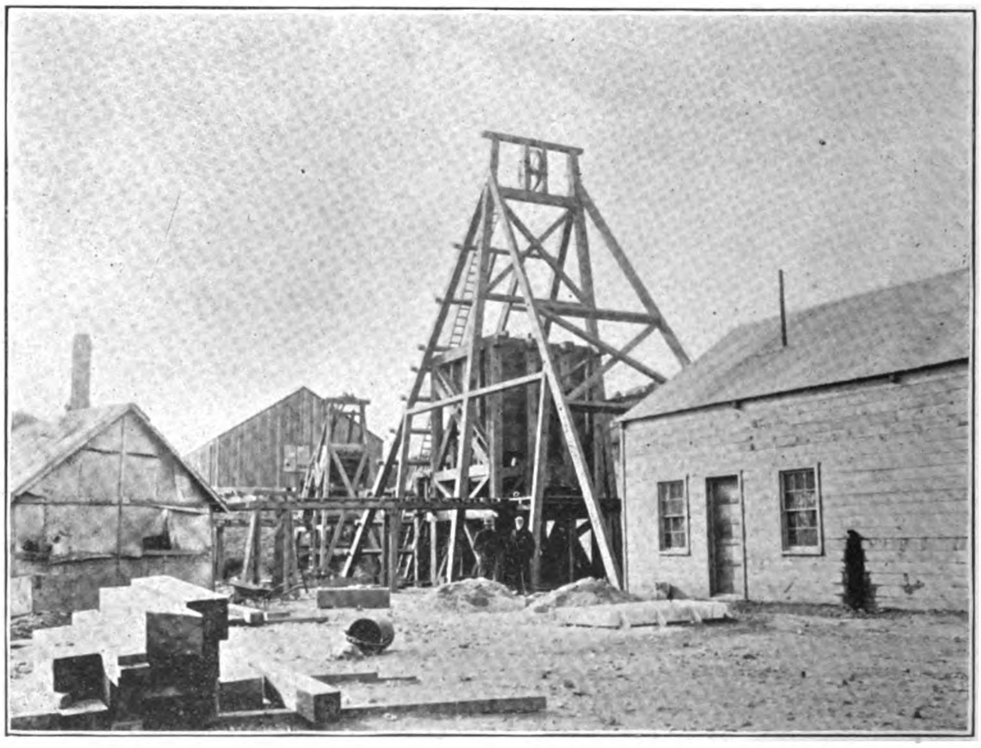
Owing to insufficient capital to carry on the work until good pay ore was reached, it looked for a time that the mines would have to shut down, but this difficulty was bridged over and work resumed, largely due to the confidence reposed in the report of the veteran engineer, Mr. R. J. Duff, the technical adviser of the company. Mr. Duff's reports on the American mines in Korea, at a time when the work was about to be abandoned as unprofitable, were of such a character as to induce the capitalists to hold on and supply more funds, with the result that today the mines have amply repaid the investors in handsome dividends.

This development of the Weihaiwei mines at the lower levels, was retarded by delays in erecting the steam-hoisting plant, and the first crushings did not pan out to the satisfaction of the shareholders, who were looking for a bonanza. Mr. Duff's first report stated that all the drifts at 40 and 100-ft. levels looked most encouraging, but as no man could look into the earth, he had been guided by appearances. He pointed to the fact that the strong outcroppings for a distance of three miles to the North and South of the workings, the character of the ore containing copper and galena sulphurites, the surest indication of a true fissure vein, and the improvement of the assays at the lower levels, all pointed to a valuable property.

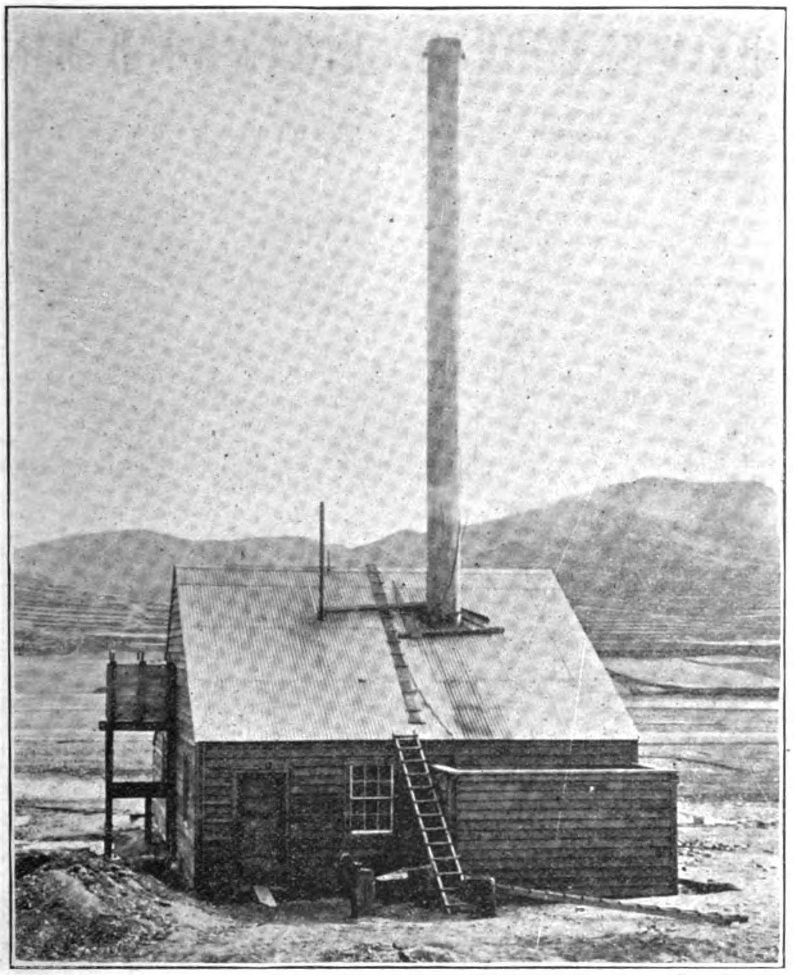
The first ordinary general meeting of the shareholders of the company was held in Shanghai recently, and the report of the engineer, Mr. Verschoyle, shows how the work has progressed up to the end of May. Following are extracts from the report:

"At the 100-ft. level there were two distinct shoots of ore, but they had now blocked out the ore down to the 100-ft. level. The prospects between the 100 and 200-ft. levels were distinctly good. Mr. Verschoyle dealt in his report first with the geological formation existing in and around the mine, and then proceeded to say that at the 100-ft. level two distinct shoots of ore had been cut through. These were both cut on the surface and were evidently both going down below the 100-ft. level, as was evidenced by the developments in No. 2 shaft and No. 2 winze. In both cases also it was plain that in both size and value the shoots were increasing. It was unusual to see two so close together and having no connection with one another. From the fact that both the No. 3 shaft and No. 2 winze, which were cutting diagonally across the shoots, continued in a good width of ore at a point where it might reasonably be expected they would be thinning out, it might be concluded that both shoots were lengthening. They, therefore, were led to the conclusion that whether above or below the 100-ft. level, they would eventually have one body of ore.

"Mr. Verschoyle emphasized the fact that this and subsequent deductions were based on a somewhat meagre supply of facts; they might prove entirely erroneous; they were only introduced because he wished to show that the expenditure necessary to exploit the 200-ft. level was justifiable, a point which



WEIHAIWEI MINES.—MAIN HOISTING PLANT AND WHIM.
Blacksmith Shop. End of Whim House. Hoist Engine and Boiler House.
Hoist Trestle to Mill. Mr. Duff and Mine Foreman.



WEIHAIWEI MINES.—PUMPING STATION, 130 FT. BELOW MILL SITE ON BANK OF THE STREAM WHICH SUPPLIES MILL WITH WATER. WATER FROM THIS STATION IS FORCED THROUGH A 6-IN. DIAMETER PIPE, LENGTH OF WHICH IS 2,060 FT.

he felt the shareholders must wish to feel assured upon. The estimate of ore tonnage above the 100-ft. level showed that as the result of the operations at the 100-ft. level there was outstanding ready for stoping 608 tons, value $2,775.20, profit $303.32; ore on dumps 300 tons, value, $1,080.20, profit $786; total 908 tons, value $3,855.20, profit $1,019.32, all values in dollars gold. This was a result that left much to be desired. The cost of milling 1,691 tons in December was $1.26. With certain alterations this might be reduced to $0.88, and later perhaps lower.

"The cyaniding costs contemplate treatment of concentrates only, or about 6 per cent of the ore mined. The item 'Mining' includes the cost of development, that is to say, cost of main shaft, levels, winzes, etc. It is obvious that the tonnage and value of ore opened up on, say the 200-ft. level, must be considerably greater than that over the 100-ft. to make it a payable transaction. Altogether it will take about 760 ft., some of which is already completed, to open up the 200-ft. level. Taking the May per foot cost at $11.80 the total cost of this work will be $8,968 (Mex.), exclusive of European salaries and Shanghai office expenses. Taking the cost of development at 25 per cent of the total cost of winning and treating the ore (a figure which it should not exceed) the total tonnage developed should have a value not less than $35,872 (Mex.).

"As to treatment of the ore, this is a subject with which it is at present impossible to deal. I think that we will be able to concentrate and cyanide, but in some of the best of the ore now coming to hand there is so much copper that cyaniding would be difficult and besides will not save the copper, which is likely to be of some importance, if the same class of ore continues.

"Unless exceptionally good developments occur in ore shoots No. 1 at the 200-ft. level, it will not be possible to start the mill under seven or eight months with any hope of keeping it going. It will be necessary to open enough ore by the 200-ft. level to keep us going until ore can be drawn from the 300-ft.

"The ore found at the 100-ft. level, together with what we have good reason to expect at the 200-ft., would keep the mill going on good pay ore for about three months, allowing a duty of three tons per stamp per day. By keeping the main shaft going down and starting winzes from the 200-ft. level as soon as possible, it will be just about possible to start the mill as soon as the 200-ft. level is run out to the end of No. 2 shoot."

Mr. Duff, asked for his opinion, said he thought the development of the mine most encouraging; everything looked better the farther they went. The ore should be sorted before it went to the mill so as not to mill ore that would not pay for it, and only that that would pay. Present developments were most encouraging. There was no better ore ever came out of a mine than that on the table, and if they had only 5 or 6 ft. of it the company would soon be paying dividends.

RAILWAYS OF JAPAN

The fifth *Financial and Economical Annual* of Japan, recently issued by the Imperial Department of Finance, at Tokyo, gives some very valuable data on the various enterprises of the country, as also a series of tabulated statistics on the railways of the empire, from which the following information is extracted which at the present time should be of more than ordinary interest and value to the Philippines, as it gives an estimate of the cost of such work in the East. The Japanese railways are all narrow gauge while the new lines proposed for the Philippines are of standard gauge, to be equipped with the most modern and approved appliances such as are in use in the United States.

The first government railway built in Japan was that between Tokyo and Yokohama, 18 m. long, which was opened in 1872. From that time the government made every effort to construct more lines, until by the fiscal year 1882-3 150 m. had been completed. The railway was at the time generally looked upon as a government undertaking, and no attempt was made among the people to engage in railway enterprise. In 1883, however, a private company was for the first time formed for the construction of railways; and thereafter railway enterprise made gradual progress among the people. In 1887 the Private Railway Regulations were issued; and both government and private railways increased and grew annually in prosperity. Now, private lines have in mileage left the government lines far behind.

In March, 1900, the Private Railways Law and the Railway Traffic Law were promulgated, thereby completing the legislation, private and public, in respect to railways. Although it has always been the policy of the government to encourage railway construction, new companies experienced no little inconvenience in obtaining the funds necessary for carrying on and extending their business because of their inability under the laws in force to mortgage their lines. To remedy this defect, the Railway Mortgage Law was promulgated in March last. Under this law a private joint-stock company may form a railway foundation with the whole or a part of its railway lines, land for railway use, buildings, instruments and appliances for railway use of attached to the railways, the rolling stock and instruments and appliances appertaining thereto, and make such foundation the object of a mortgage. The amount of obligations, moreover, that may be incurred by the company on mortgage of its railway foundation, when added to the amount of its already existing debentures, must not exceed its total paid up capital, the amount of its old debts, however, not being included therein. This law further contains detailed provisions respecting the effect of mortgage, registration of railway foundation, and compulsory administration and sale by auction. The law will, it is confidently believed, contribute materially to the activity or railway enterprise in the empire.

TOKAIDO LINE.—Lines in operation, 403.52 m.; length of track, 811.60 m.; under construction, 2.57 m. *Cost of Construction*—Lines in operation, -Y-53,702,091; lines under construction, -Y-820,170. Total, -Y-54,522,261. Average cost per m. of lines in operation (total), Y-133,041. Expenses, including rolling stock, -Y-103,489. *Itemization of Cost*—Location and survey, inspection and general expenses -Y-1,-785,857; purchase of land, -Y-2,381,435; earthwork, -Y-6,271,709; bridges, -Y-12,462,574; culverts, -Y-1,464,858; draining, -Y-193,731; tunnels, -Y-3,794,120; permanent way, -Y-7,-084,240; stations, -Y-2,541,796; landing places, -Y-6,655; rolling stock, -Y-11,928,719; workshops, -Y-1,152,367; various buildings, -Y-626,-735; transportation, -Y-904,277; construction trains, -Y-234,767; tools and implements -Y-257,-292; fences and boundary marks, -Y-63,404; telegraph and telephones, -Y-209,431; other expenses -Y-39,152. Total, -Y-53,702,091. *Revenue and Expenditure*—Receipts: Passenger, -Y-9,-831,538; freight, -Y-3,936,258; other sources, -Y-291,295. The Total, -Y-14,059,091. Expenses: Maintenance, -Y-1,176,127; motive power, -Y-2,-328,297; traffic, -Y-1,662,502; general, -Y-121,-566. Total, -Y-5,288,492. *Net Earnings*—Total, -Y-8,770,599; rate to cost of construction (per cent), 16.3. *Earnings and Expenses per Day, per Mile.*—Average receipts per day per mile. Passenger, -Y-66.55; freight, -Y-26.64; other sources, -Y-1.97. Total, -Y-95.16. Expense: Maintenance, -Y-7.96; motive power -Y-15.76; traffic, -Y-11.25; general, -Y-0.82. Total -Y-35.79. Net earnings, -Y-59.37. Average receipts per train mile, -Y-2.33; expenses, -Y-0.88; net earnings, -Y-1.45; expenses per -Y-100 of earnings, -Y-37.62.

HOKURIKU LINE.—Lines in operation, 154.12 m.; length of track, 179.13 *Cost of Construction*

—Lines in operation, -Y-12,386,034; average cost per m. of lines in operation (total), -Y-80,-351; expenses, including rolling stock, -Y-71,-259. *Itemization of Cost*—Location and survey, inspection and general expenses, -Y-685,361; purchase of land, -Y-704,750; earthwork, -Y-1,683,269; bridges, -Y-1,856,013; culverts, -Y-400,235; draining, -Y-67,026; tunnels, -Y-1,-943,405; permanent way, -Y-1,713,202; stations, -Y-443,183; landing places, -Y-105,673; rolling stock, -Y-1,401,458; workshops, -Y-60,-904; various buildings, -Y-184,695; transportation, -Y-914,188; construction trains, -Y-73,-456; tools and implements, -Y-93,901; fences and boundary marks, -Y-13,429; telegraph and telephones, -Y-41,856; other expenses, -Y-30. Total, -Y-12,386,034. *Revenue and Expenditure*—Receipts: Passenger, -Y-997,917; freight, -Y-646,724; other sources, -Y-13,359. Total, -Y-1,658,000. Expenses: Maintenance, -Y-286,544; motive power, -Y-323,744; traffic, -Y-225,834; general, -Y-19,708. Total, -Y-855,-830. *Net Earnings*—Total, -Y-802,170; rate to cost of construction (per cent), 6.5. Expenses—Total, -Y-802,170. *Earnings and Expenses per day per Mile*—Average receipts per day per mile: Passenger, -Y-17.69; freight, -Y-11.46; other sources, -Y-0.24. Total, -Y-29.-39. Expenses: Maintenance, -Y-5.08; motive power, -Y-5.74; traffic, -Y-4; general, -Y-0.35. Total, -Y-15.17. Net earnings, -Y-14.22. Average receipts per train mile, -Y-1.61; expenses, -Y-1.83; net earnings, -Y-0.78; expenses per -Y-100 of earnings, 51.62.

CENTRAL LINE (EAST AND WEST LINES).—Lines in operation, 110.81 m.; length of track 134.29 m.; under construction, 113.28 m. *Cost of Construction*—Lines in operation, -Y-19,-933,140; lines under construction, -Y-4,090,181. Total, -Y-24,023,321. Average cost per mile of lines in operation (total), -Y-349,124. Expenses, including rolling stock, -Y-332,401, *Itemization of Cost*—Location and survey. inspection and general expenses, -Y-1,802,974; purchase of land, -Y-2,002,765; earthwork, -Y-3,533,451; bridges, -Y-2,034,587; culverts, -Y-507,639; draining, -P-146,676; tunnels, -Y-8,-467,495; permanent way, -Y-1,961,506; stations, -Y-476,837; rolling stock, -Y-939,128; workshops, -Y-23,484; various buildings, -Y-361,-694; transportation, -Y-1,299,036; construction trains, -Y-114,488; tools and implements, -Y-274,101; fences and boundary marks, -Y-17,323; telegraph and telephones, -Y-60,137. Total, -Y-24,023,321. *Revenue and Expenditure*—Receipts: Passenger, -Y-374,256; freight, -Y-212,501; other sources, -Y-6,718. Total, -Y-593,475. Expenses: Maintenance, -Y-100,964; motive power, -Y-127,394; traffic -Y-96,412; general, -Y-7,676. Total, -Y-332,-446. *Net Earnings*—Total, -Y-261,029; rate to cost of construction (per cent), 3.2. *Earnings and Expenses per Day, per Mile*—Average receipts per day per m.: Passenger, -Y-19.95; freight, -Y-11.39; other sources, -Y-0.35. Total, -Y-31.69. Expenses: Maintenance, -Y-5.38; motive power, -Y-6.75; traffic, -Y-5.11; general, -Y-0.41. Total, -Y-17.65. Net earnings, -Y-14.04. Average receipts per train m., -Y-2.76; expenses, -Y-1.45; net earnings, -Y-1.31; expenses per -Y-100 of earnings, 109.51.

SHINYETSU LINE.—Lines in operation, 117.66 m.; length of track, 139 m. *Cost of Construction*—Lines in operation, -Y-7,565,548; average cost per m. of lines in operation (total), -Y-64,-210; expenses, including rolling stock, -Y-52,305. *Itemization of Cost*—Location and survey, inspection and general expenses, -Y-317,172; purchase of land, -Y-375,113; earthwork, -Y-1,298,220; bridges, -Y-639,879; culverts, -Y-209,563; draining, -Y-61,745; tunnels, -Y-822,558; permanent way, -Y-1,162,209; stations, -Y-422,239; landing places, -Y-133; rolling stock, -Y-1,402,661; workshops, -Y-114,-419; various buildings, -Y-195,958; transportation, -Y-444,179; construction trains, -Y-30,-741; tools and implements, -Y-28,843; fences and boundary marks, -Y-5,824; telegraph and telephones, -Y-34,092. Total, -Y-7,565,-548. *Revenue and Expenditures*—Receipts: Passenger, -Y-863,643; freight, -Y-573,069; other sources, -Y-16,071. Total, -Y-7,565,548. Expenses: Maintenance, -Y-279,979; motive power, -Y-613,373; traffic, -Y-230,360; general, -Y-26,346. Total, -Y-1,150,058. *Net Earnings*—Total, -Y-302,725; rate to cost of construction (per cent), 4. *Earnings and Expenses per Day, per Mile*—Average receipts per day per m.: Passenger, -Y-20.03; freight, -Y-13.29; other sources, -Y-0.37. Total, -Y-33.-69. Expenses: Maintenance, -Y-6.49; motive power, -Y-14.23; traffic, -Y-5.34; general, -Y-0.61. Total,-Y-26.67. Net earnings,-Y-7.02. Average receipts per train mile, -Y-1.52; expenses, -Y-1.20; net earnings, -Y-0.32; expenses per -Y-100 of earnings, 79.16.

SHINONOI LINE.—Lines in operation, 42.06 m.; length of track, 50.62 m. *Cost of Construction*—Lines in operation, -Y-7,677,741; average cost per m. of lines in operation (total), -Y-182,-478; expenses, including rolling stock, -Y-161,-973. *Itemization of Cost*—Location and survey, inspection and general expenses, -Y-459,-344; purchase of land, -Y-368,651; earthwork, -Y-1,199,655; bridges, -Y-180,975; culverts, -Y-158,263; draining, -Y-27,499; tunnels, -Y-2,-951,802; permanent way, -Y-572,470; stations, -Y-174,450; rolling stock, -Y-862,725; workshops, -Y-108,732; various buildings, -Y-174,-391; transportation, -Y-383,895; construction trains, -Y-53,224; tools and implements, -Y-109,-410; fences and boundary marks, -Y-6,263; telegraph and telephones, -Y-12,992. Total, 7,677,471. *Revenue and Expenditure*—Receipts: Passenger, -Y-216,159; freight, -Y-177,795; other sources, -Y-2,078; Total, -Y-396,032. Expenses: Maintenance, -Y-113,962; motive power, -Y-92,563;; traffic, -Y-50,894; general, -Y-6,016. Total, -Y-263,435. *Net Earnings*—Total, -Y-132,597; rate to cost of construction (per cent), 1.7. *Earnings and Expenses per Day, per Mile*—Average receipts per day, per m.: Passenger, -Y-14.04; freight, -Y-11.55; other sources, -Y-0.13. Total, -Y-25.72. Expenses; Maintenance, -Y-7.40; motive power, -Y-6.01; traffic, -Y-3.31; general, -Y-0.39. Total, -Y-17.11. Net earnings, -Y-8.61. Average receipts per train m., -Y-1.56; expenses, -Y-1.04; net earnings, -Y-0.52; expenses per -Y-100 of earnings, 66.52.

OHU LINE (SOUTH AND NORTH LINES).—Lines in operation, 217.01 m.; length of track, 254.03 m.; under construction, 84.74 m. *Cost of Construction*—Lines in operation, -Y-18,-683,494; lines under construction, -Y-4,300,679. Total, -Y-22,984,173. Average cost per m. of lines in operation (total), -Y-176,627; expenses, including rolling stock, -Y-164,011; *Itemization of Cost*—Location and survey, inspection and general expenses, -Y-1,518,945, purchase of land, -Y-1,314,501; earthwork, -Y-4,192,915; bridges, -Y-3,096,871; culverts. -Y-844,216; draining, -Y-293,025; tunnels, -Y-3,523,179; permanent way, -Y-3,629,824; stations, -Y-706,222; rolling stock, -Y-1,362,-024; workshops, -Y-25,134; various buildings, -Y-654,740; transportation, -Y-1,351,806; construction trains, -Y-216,589; tools and implements, -Y-129,173; fences and boundary marks, -Y-29,199; telegraph and telephones, -Y-85,810. Total, -Y-22,984,173. *Revenue and Expenditure*—Receipts: Passenger, -Y-578,239; freight, -Y-381,351; other sources, -Y-13,838. Total, -Y-973,428. Expenses: Maintenance, -Y-373,-177; motive power, -Y-345,217; traffic, -Y-199,-823; general, -Y-21,575. Total -Y-939,791 (the South Line was operated at a loss of -Y-5,-847 and the North Line showed a profit of -Y-39,484). *Net Earnings*—Total, -Y-33,637; rate to cost of construction, North Line, (per cent), 4. *Earnings and Expenses per Day, per Mile*—Average receipts per day per m.: Passenger, -Y-14.96; freight, -Y-9.84; other sources, -Y-0.35. Total, -Y-25.15. Expenses: Maintenance, -Y-9.67; motive power, -Y-9.03; traffic, -Y-5.16; general -Y-0.56. Total, -Y-24.-42; net earnings North Line, -Y-0.90 and loss on South Line -Y-0.17. Average receipts per train m., -Y-2.53; expenses, -Y-2.45; net earnings (North Line), -Y-0.10; loss (South Line), -Y-0.02; expenses per -Y-100 of earnings, 193.97.

KURE LINE.—Lines in operation, 12.35 m.; length of track, 16.37 m. *Cost of Construction*—Lines in operation, -Y-2,152,520; average cost per m. of lines in operation (total), -Y-173,067; expenses, including rolling stock, -Y-133,113. *Itemization of Cost*—Location and survey, inspection and general expenses, -Y-147,-025; purchase of land, -Y-140,237; earthwork, -Y-505,639; bridges, -Y-119,931; culverts, -Y-50,897; draining, -Y-20,867; tunnels, -Y-324,-905; permanent way, -Y-181,491; stations, -Y-62,785; rolling stock, -Y-496,937; workshops, -Y-20,780; various buildings, -Y-33,827; transportation, -Y-19,713; construction trains, -Y-4,-393; tools and implements, -Y-3,894; fences and boundary marks, -Y-14,601; telegraph and telephones, -Y-4,598. Total, -Y-2,152,520. *Revenue and Expenditure*—Receipts: Passenger, -Y-15,559; freight, -Y-849; other sources, -Y-82. Total, -Y-16,490. Expenses: Maintenance, -Y-2,205; motive power, -Y-5,805; traffic -Y-9,646; general, -Y-415. Total, -Y-18,-071. *Net Loss*—Total, -Y-1,581; rate to cost of construction (per cent), -Y-0.1 (dec). Expenses: Total decrease, -Y-1,581. *Earnings and Expenses per Day, per Mile*—Average receipts per day, per mile: Passenger, -Y-13.03; freight, -Y-0.71; other sources, -Y-0.07. Total, -Y-13.81. Expenses: Maintenance, -Y-1.81; motive power, -Y-4.86; traffic, -Y-8.08; general, -Y-0.35. Total, -Y-15.13—loss, -Y-1.32. *Net Earnings*—Average receipts per train mile, -Y-1.02; expenses, -Y-1.11; net loss, -Y-0.09; expenses per -Y-100 of earnings, 109.59.

KAGOSHIMA LINE.—Lines in operation, 40.42 m.; length of track, 48.24 m.; under construction 53.58 m. *Cost of Construction*—Lines in operation, -Y-4,576,445; lines under construction, -Y-3,109,739. Total, -Y-7,686,184. Average cost per m. of lines in operation (total), -Y-112,-929; expenses, including rolling stock, -Y-98,374. *Itemization of Cost*—Location and survey, inspection and general expenses, -Y-643,758; purchase of land, -Y-435,992; earthwork, -Y-1,625,207; bridges, -Y-695,846; culverts, -Y-247,361; draining, -Y-91,599; tunnels, -Y-1,-930,283; permanent way, -Y-866,336; stations, -Y-118,399; rolling stock, -Y-589,822; workshops, -Y-18,700; various buildings, -Y-155,983; transportation, -Y-179,858; construction trains, -Y-20,926; tools and implements, -Y-25,699; fences and boundary marks, -Y-16,249; telegraph and telephones, -Y-24,166. Total,- Y-7,-686,184. *Revenue and Expenditure*—Receipts: Passenger, -Y-111,123; freight -Y-29,101; other sources, -Y-888. Total, -Y-141.112, Expenses: Maintenance, -Y-48,415; motive power, -Y-34,-128; traffic, -Y-27,747; general, -Y-2,489. Total, -Y-112,779. *Net Earnings*—Total, -Y-28,333; rate to cost of construction (per cent), 6. *Earnings and Expenses per Day, per Mile*—Average receipts per day per mile: Passenger, -Y-8.25; freight, -Y-2.16; other sources, -Y-0.07. Total, -Y-10.48. Expenses: Maintenance, -Y-3.60; motive power, -Y-2.53; traffic, -Y-2.06; general, -Y-0.19. Total, -Y-8.38. Net Earnings, -Y-2.10. *Net Earnings*—Average receipts per train mile, -Y-1.28; expenses, -Y-1.02; net earnings, -Y-0.26; expenses per -Y-100 of earnings, 79.92.

HOKKAIDO GOVERNMENT RAILWAYS.—Lines in operation, 198.69 m.; length of track, 221.64 m.; under construction, 364.01 m. *Cost of Construction*—Lines in operation, -Y-8,886,-421; lines under construction, -Y-1,062,980 Total, -Y-9,949,401. Average cost per mile of lines in operation (total), -Y-44,686; expenses, including rolling stock, -Y-39,688. *Itemization of Cost*—Location and survey, inspection and general expenses, -Y-1,061,805; purchase of land, -Y-29,955; earthwork, -Y-2,124,924; bridges, -Y-1,107,306; culverts, -Y-95,717; draining, -Y-46,519; tunnels, -Y-649,302; permanent way, -Y-2,508,063; stations, -Y-280,053; landing places, -Y-7,781; rolling stock, -Y-993,949; workshops, -Y-325,656; various buildings, -Y-300,035; transportation, -Y-159,695; construction trains, -Y-67,046; tools and implements -Y-94,936; fences and boundary marks, -Y-15,-534; telegraph and telephones, -Y-52,343; other expenses, -Y-38,377. Total, -Y-9,958,996. *Revenue and Expenditure*—Receipts: Passenger, -Y-268,172; freight, -Y-446,786; other sources, -Y-32,412. Total -Y-747,373. Expenses: Maintenance, -Y-209,051; motive power, -Y-171,-934; traffic, -Y-421,600; general, -Y-58,888. Total, -Y-861,473. *Net Loss*—Total, -Y-114,-100; rate to cost of construction (per cent), 1.3. (dec) *Earnings and Expenses per Day,*

per Mile—Average receipts per day per m.: Passenger, -Y-4.12; freight, -Y-6.87; other sources, -Y-0.50. Total, -Y-11.49. Expenses: Maintenance, -Y-3.21; motive power, -Y-2.64; traffic, -Y 6.48; general, -Y-0.91. Total, -Y-13.-21. Net loss, -Y-1.75. *Net Earnings*—Average receipts per train m., -Y-1.71; expenses, -Y-1.97; net loss, -Y-0.26; expenses per -Y-100 of earnings, 115.25.

INYO LINE.—*Revenue and Expenditure*—Receipts: Passenger, -Y-55,117; freight, -Y-15,-627; other sources, -Y-587. Total, -Y-71,331. Expenses: Maintenance, -Y-26,601; motive power, -Y-22,930; traffic, -Y-23,336; general, -Y-1,659. Total, -Y-74,526. *Net Loss*—Total, -Y-3,195; rate to cost of construction (per cent), 1 (dec). *Earnings and Expenses per Day, per Mile*—Average receipts per day per mile: Passenger, -Y-4.66; freight, -Y-1.32; other sources, -Y-0.05. Total, -Y-6.03. Expenses: Maintenance, -Y-2.25; motive power, -Y-1.94; traffic, -Y-1.97; general, -Y-0.14. Total, -Y-6.30; net loss, -Y-0.27. *Net Earnings*—Average receipts per train mile, -Y-0.65; expenses, -Y-0.68; net loss, -Y-0.03; expenses per -Y-100 of earnings, 104.48.

STREET LINE.—Lines under construction, 2 m. *Cost of Construction*—Total, -Y-2,763,331. *Itemization of Cost*—Location and survey, inspection and general expenses, -Y-114,449; purchase of land, -Y-1,264,153; earthwork, -Y-205,877; bridges, -Y-1,032,675; culverts, -Y-15,974; draining, -Y-150; permanent way, -Y-12,524; stations, -Y-35,550; rolling stock, -Y-298; various buildings, -Y-9,461; transportation, -Y-37,204; construction trains, -Y-6,962 tools and implements, -Y-27,881; fences and boundary marks, -Y-173.

LINE CONNECTING THE SAN-IN WITH THE SAN-YO.—Lines in operation, 47 m.; length of track, 54.66 m.; under construction, 89:70 m. *Cost of Construction*—Lines in operation, -Y-3,802,896; lines under construction, -Y-1,-771,402. Total, -Y-5,574,298. Average cost per mile of lines in operation (total), -Y-80,913; expenses, rolling stock included, -Y-71,844. *Itemization of Cost*—Location and survey, inspection and general expenses, -Y-386,293; purchase of land, -Y-515,310; earthwork, -Y-881,083; bridges, -Y-873,769; culverts, -Y-216,486; draining, -Y-61,108; tunnels, -Y-619,-757; permanent way, -Y-1,069,391; stations, -Y-119,254; rolling stock -Y-426,211; workshops, -Y-20,222; various buildings, -Y-102,328; transportation, -Y-193,237; construction trains, -Y-20,629; tools and implements, -Y-18,896; fences and boundary marks, -Y-7,526; telegraph and telephones, -Y-14,798. Total, -Y-5,574,298.

MAIZURU LINE.—Lines under construction, 25.44 m. *Cost of Construction*—Total, -Y-1,-341,459. *Itemization of Cost*—Location and survey, inspection and general expenses, -Y-106,337; purchase of land, -Y-382,072; earthwork -Y-166,337; bridges, -Y-130,110; culverts, -Y-60,340; draining, -Y-13,393; tunnels, -Y-30,862; permanent way, -Y-258,530; stations, -Y-3,531; various buildings, -Y-33,088; transportation, -Y-69,406; construction trains, -Y-79; tools and implements, -Y-6,611; telegraph and telephones, -Y-3,834; other expenses, -Y-75,719. Total, -Y-1,341,459.

CONNECTING LINE WITH SEA, YOKOHAMA.—Purchase of land, -Y-28,404.

CONNECTING LINE WITH SEA, KOBE.—*Itemization of Cost*—Location and survey, inspection and general expenses, -Y-13,542; purchase of land, -Y-668,880; earthwork, -Y-20,729; bridges, -Y-15,248; culverts, -Y-36,019; draining, -Y-3,305; permanent way, -Y-30,770; stations, -Y-934; various buildings, -Y-2,073; transportation, -Y-107; telegraph and telephones, -Y-159. Total, -Y-791,766.

PROVINCIAL HARBORS, PHILIPPINES

IMPROVEMENT OF THE PORT OF CEBU.—This work was authorized by Acts Nos. 640 and 1342, which appropriated -P-1,084,000 for the purpose, and its transfer to this office by Act. No. 1339. The original project was prepared under the direction of the Bureau of Engineering and provides for the construction of a bulkhead of concrete masonry 2600 ft. long, the reclaiming of about 13 acres of land along the waterfront and the dredging along the bulkhead to 18 and 23 ft. below mean low water. The project for the bulkhead has been modified by the substitution of concrete deposited in mass for the concrete blocks of the original design. The area of the section has also been enlarged, and a vertical face given to the wall. The contract for the work was awarded to J. G. White & Company on March 30th, 1904. This contract specifies that the cement required shall be furnished by the government, and a contract was entered into January 21st, 1905, with the Alson Portland Cement Company, for delivering 30,000 bbls. of cement. 10,979 bbls. have been delivered and stored by the contractors for the work who began operations December 15th, 1904. At the close of the fiscal year there had been erected two store-houses for cement, a concrete mixer, and a railroad built about 2.5 miles in length from the Guadalupe River to the concrete mixer, which is to be used for transporting band and gravel for the work. The work has been in local charge of Mr. T. Warren Allen, Supervisor, Province of Cebu, Cebu, P. I.

The following statement of the entrance and clearance of vessels by fiscal years since American occupation has been furnished by the Collector of Customs, Philippine Islands:

CEBU, COASTWISE.

	ENTERED.		CLEARED.	
Year	Vessels	Tonnage	Vessels	Tonnage
1899	218	27,828	208	28,086
1900	1,347	100,676	1,642	104,701
1901	3,685	145,726	4,225	147,598
1902	5 008	165,485	5,263	151,850
1902	4,099	168,718	4,206	169,892
1904	2,755	193,174	2,875	196,560
1905	2,637	191,593	2,973	191,880

CEBU, FOREIGN.

1899	14	14,419	8	9,132
1900	54	60,130	48	59,147
1901	71	91,013	75	94,780
1902	73	88,438	62	86,456
1903	118	169,257	113	68,316
1904	110	152,023	105	45,625
1905	123	166,433	112	75,174

IMPROVEMENT OF THE PORT OF ILOILO.—This improvement was provided for by Acts Nos. 641 and 1342, appropriating -P-532,000 for the purpose, and the work was transferred to this office by Act No. 1339. The original project was prepared under the direction of the Bureau of Engineering and provides for the dredging of a channel in the Iloilo River to a depth of not less than 15 ft. at mean low water, the construction of breakwaters across the bar at the entrance to the river, and the construction of a system of dikes and levees to control the river flow. The contract for the work was awarded to J. G. White & Company on March 30th, 1904, who began operations in August. At the close of the fiscal year the contractors had driven 24,300 lineal ft. of piles, delivered 2300 cords of facines of which 2100 cords had been placed in the dikes, and quarried 14,500 tons of stone of which 13,400 had been deposited on the breakwaters and dikes. A 16-in. suction dredge is being constructed by the contractors who expect to begin dredging operations early in August. The work has been in local charge of Assistant Engineer W. Meadowcroft.

The following statement of the entrance and clearance of vessels by fiscal years since American occupation has been furnished by the Collector of Custom, Philippine Islands.

ILOILO, COASTWISE.

	ENTERED.		CLEARED.	
Year	Vessels	Tonnage	Vessels	Tonnage
1899	108	41,091	146	44,655
1900	312	77,837	585	82,784
1901	2,171	137,844	2,232	139,303
1902	3,553	203,290	3,584	202,012
1903	3,398	194,917	3,485	195,763
1904	3,381	184,050	3,362	182,278
1905	3,557	176,152	3,523	173,448

ILOILO, FOREIGN.

1899	24	26,865	27	35,769
1900	47	55,330	52	62,775
1901	70	77,303	75	81,585
1902	85	87,527	92	94,419
1903	105	115,843	105	115,216
1904	118	121,188	117	131,081
1905	90	128,193	93	135,046

SURVEYS AND INVESTIGATIONS OF NAVIGABLE RIVERS.—By Act 1339 the surveys and investigations of navigable rivers and harbors will be made by this office excepting such as have been assigned by law to the Coast and Geodetic Survey. Such waterways are numerous in the Philippines and near them is found the great mass of the native population. With the ocean and seas with which they connect they form natural lines of communication over which products may be transported much cheaper than over any railroad and which for long distances will require no annual expenditure for maintenance of way. To perfect these waterways there is only required what in railroad parlance are termed terminal facilities.

While Manila with its now harbor, the Pasig river, and its numerous esteros, will soon possess facilities for water transportation equalled by few cities in the world, but little has been done by the General Government, by the Municipalities or by private interests to develop the other ends of these lines, nor does there exist reliable data upon which to base projects for improvements.

The railroad development which has been proposed may so tax the revenues of the Government as to render it inadvisable at the present time to enter into a general plan of improving waterways, but the construction of these railroads will necessitate the immediate development of the harbors from which they start.

An appropriation of -P-30,000 for making the necessary surveys and investigations for the improvement of such harbors is recommended.

GRAVITY WATER SUPPLY FOR THE CITY OF MANILA, P. I.

(Concluded from page 90)

the disposal of excavated material; building of a gatehouse and chambers and the setting of iron pipes, connections, and all other metal work; construction of walls and embankments, and lining of the entire reservoir. Under the overlying top-soil dressing, which is of shallow depth, it is believed that the excavation will be in *adobe* stone throughout. The entire embankments as supports to walls will be built of selected materials deposited in layers not over 4 in. thick, and each layer will be thoroughly compacted by watering and rolling or ramming. Embankments will start from a carefully prepared base on the rock and those that are to be covered with concrete will be made of an extra width of at least 1 ft. and afterwards dressed to finished lines.

The entire inner surface of the reservoir will be lined in the following manner:—

Over all surfaces in solid rock without defects a plaster coat will be applied. On all surfaces of embankments, defective rock, etc., a layer of concrete 4 in. in thickness will be p aced, and this layer will be finished with a top skim coat. Expansion joints will be left in all concrete lining. Parapet walls, walks, etc., will be constructed in the proportion of 1 of cement, 2½ of sand, and 4 of broken stone or gravel.

GATEHOUSE.—The gatehouse will be built of pitched-faced, coursed ashlar masonry. They will begin at the level of the top of the embankment at approximately an elevation of 142 ft. Stone for the masonry will be furnished by the City of Manila and delivered at the site of the work, where it will be cut and dressed, etc., by the contractor. The city will furnish all iron and other metal work required for permanent use at the gatehouse. Roof timbers and sheatings will be of the best California redwood, and all doors, frames and wood mouldings of the first group of Philippine hard woods The principal items of iron and other meta. to be placed, are as follows:—

Inlet chamber screens and gratings, pipe from inlet chamber to distributing tank, distributing tank, inlet pipe to reservoir, supply pipe, waste pipes, all valves, fittings, etc., stairs and railings, checkered floor plates, iron girders, crane and track, metal roofing, any other metal work shown on the plans or found necessary to be placed.

WESTERN AUSTRALIAN HARDWOODS, JARRAH AND KARRI

Report by the Late Mr. J. EDNIE BROWN, Conservator of Forests

JARRAH FOREST.

KARRI FOREST.

THE LEADING WESTERN AUSTRALIAN TIMBERS suitable for commercial purposes are the well-known Jarrah (*Eucalyptus marginata*) and Karri (*Eucalyptus diversicolor*), which are strictly indigenous to this state. Among other Western Australian timbers, however, worthy of attention are Tuart (*Eucalyptus gomphocephala*), one of the most valuable Australian woods, Red Gum (*E. calophylla*), Wandoo or White Gum (*E. redunca*), Blackbutt (*E. patens*), York Gum (*E. loxophleba*), Yate Gum (*E. cornuta*), and Flooded Gum (*E. rostrata*). These and other Eucalypts, of which there are many varieties in Western Australia, are suited for street paving, engineering (locomotive and marine), wheelwrighting, and general constructive works; and some of them, with other classes of timber, notably the Casuarinas and Acacias, may be used to great advantage in cabinet and art work.

But Jarrah and Karri, from their widely known and popular character, demand special attention.

The Jarrah forests are computed to cover an area of 8,000,000acres, and Karri 1,200, 000 acres, a total area of between 14,000 and 15,000 sq. m. These compact forest areas lie in the south-western part of the state, and are within a comparatively short distance of the coast, while the Great Southern and South Western Railway systems, with their branch lines, afford communication with the principal harbors.

JARRAH —This is without doubt the principal timber tree in the Western Australian forests; no one knowing the subject would for a moment dream of classifying it as anything else. It is predominant above all others in its extent of forest, the various uses to which it is or can be applied, the part which it is now taking in the great timber export of the colony, and the esteem in which it is held in the country. Jarrah and Western Australia are almost synonymous words, and, as this has been the case from the earliest days of the foundation of the colony, so it will now remain as long as a Jarrah forest exists. I do not mean by these remarks to disparage in the least degree any of the other commercial woods of the country, but simply to emphasize the fact that Jarrah is the principal indigenous timber of this part of the Australian Continent. There are other timbers in our forests which are equally, if not more, valuable, for their own special purposes, as I shall point out, but for general constructive works necessitating contact with soil and water, the timber of this tree stands foremost in these forests.

The specific name refers to the thickened margin of the leaves, and the vernacular is the name given to the species by the aborigines. In some districts, the tree is known to the settlers as the "mahogany gum."

Taken as a whole, there is nothing particularly picturesque about the appearance of a Jarrah tree or forest of these. Indeed, the general effect of the species, *en masse*, is dull, sombre, and uninteresting to the eye. Except in special spots and localities, the trees are rugged and decidedly inclined to be straggling and branchy. In this respect they differ very materially from the karri, which is almost invariably a fine straight tree and comparatively free from branches except at the top.

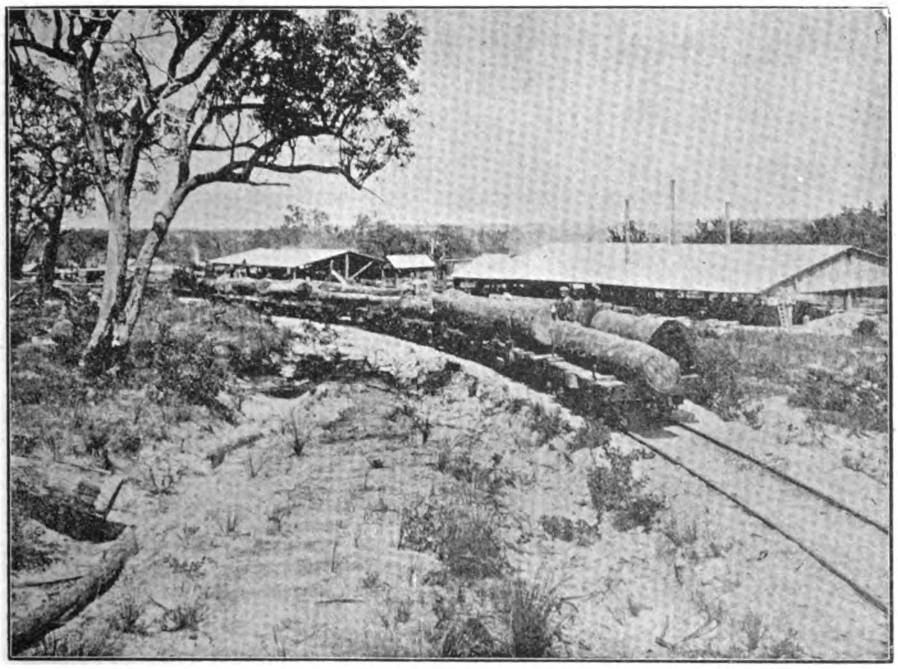
In general appearance the Jarrah resembles what is known in the other colonies as the stringy-bark. Its likeness to this division of the Eucalyptus family is very marked. The bark is therefore persistent, fibrous, and of a dark grey color, although more deeply indented in its longitudinal furrows than the true stringy-bark.

It is not uncommon to find considerable areas of Jarrah forest where many of the matured trees attain heights of from 90 ft. to 120 ft., with good stems 3 ft. to 5 ft. in diameter, and 50 ft. to 60 ft. to the first branch. Such places would be described as first-class Jarrah forest. Taking an average, however, of these forests, I think a Jarrah tree of a good healthy stamp and one representing a fair specimen of its kind, would run about 90 ft. to 100 ft. in height, and from 2½ ft. to 3½ ft. in diameter at the base. Under such conditions and in fairly favorable situations, trees of this size might be expected to be sound and convertable into good marketable timber without much waste.

Of course, in places there are individual trees to be met with the measurements of which run into figures far in excess of those just mentioned, and one or two of these may be cited as indicative of the possibilities of the tree as regards size and wealth of timber. One, about three miles west of the old Welllington Mill upon the Ferguson River, measured 22 ft. in circumference at 5 ft. up from the ground antd 80 ft to the first branch. It is a fine, sraight,. handsome tree, apparently perfectly sound, and would turn out at least 20 loads of good sawn timber. Another large specimen on the Ferguson area went 21 ft. in circumference at 4ft. from the ground, and 75 ft. to the first branch. And yet another, this time in the Ironpot area; this measured 22 ft. in circumference at 4 ft. up, and 60 ft. to the first limb. These few instances of the actual measurements of lareg Jarrah trees will show to what an immense size the species will sometimes attain, under what must, of course, be favorable circumstances.

As regards the age of the tree when it has attained a diameter of about 2 ft., or has reached that stage when it may be considered fit for the saw mill, I have gone carefully into this question by having trees cut down and their concentric rings counted, and have come to the conclusion that in good situations it will attain this size when about 40 or 50 years of age.

So far as my observations have extended, the Jarrah is confined in its distribution to what is known as the South-Western Division of the colony, and this, I understand, is practically its geographical limits. On reference to the plan attached, it will be seen that this district lies along the western coast of the colony, between latitudes 31 degrees and 35 degrees south and longitude 115 degrees and 119 degrees east. This means a scope of country



MILLARS' KARRI & JARRAH CO.—PRIVATE RAILWAY

extending nearly 350 miles running north and south, and from 50 to 100 miles east and west, and embraces all that portion of the country upon which the heaviest rains of the season fall, which averages 40 in. in the south and 35 in. in the north. An average of 10 years shows the rainfall of this, the timbered district of the colony, as 38 in.

The Jarrah is purely a semi-coastal tree, by which I mean that it is not found anywhere strictly beyond the influence of the sea, and yet is not at all partial to the direct effects of the sea-breezes. Perhaps the best forests of the species are found from 20 to 30 miles off the coastal line. Whether this fact is only co-existent with the heavy rainfall district, and that, with an equal rainfall more inland, the result of growth would be equally as good as along the coast, I am not prepared to say.

The principal habitat of the tree is therefore along the table-lands and slopes of the Darling Range, which runs through nearly the whole of the South-Western District. Perhaps the best areas of Jarrah lie along that portion of this range from the Blackwood River north to the Helena River, with the choicest portions midway between these two points.

In all cases this tree delights in an ironstone formation, and it would almost appear as though the rougher and the more the site is composed of Ironstone rocks and barren of almost any other vegetation, the better the tree will grow. It is certainly beyond a doubt that, under such circumstances, the timber attains its greatest degree of soundness, strength, and general durability. There are, it is true, some fine belts and patches of Jarrah forest to be found upon many of the lower-lying portions of the district referred to, where the geological formation of these is composed of ironstone—as for instance in the country lying between Quindalup and Karridale—the timber is good in every respect.

It is indeed asserted by some and denied by others that the timber grown on the flats is superior in its lasting qualities to that grown on the hills, but this wants further verification before being accepted as a fact. I may, however, state that I have seen some specimens of the timber which had been cut from trees grown on the flats, which were in an apparently sound condition after having been in the ground and water for over 40 years.

It is very marked that so soon as a granite formation comes in, so sure will the Jarrah forest fall off to a mere scrub, if it does not disappear altogether. This is a well-known fact to those who have travelled through these forests.

We find Jarrah all over the South-Western Division and almost invariably intermixed with red gum, and in places with the blackbutt as well, the latter always in the hollows and richer portions of the district. In some parts of the karri country, to which I shall more particularly refer later on, the Jarrah appears to mix with the former, except in places where the karri takes possession of the ground to the exclusion of all others. It is, however, a fact that in almost all cases the Jarrah is to be found, if not exactly intermixed with the karri, at all events in close proximity to it. This is an important fact, which should be of advantage to intending exporters of our timbers.

The late Baron Sir F. von Mueller, the great and well known botanist of Victoria, said "the Jarrah is famed for its indestructible wood, which is neither attacked by the borings of the Chelura, Teredo, nor Termite."

Its resistance to white ants is remarkable and houses built of the wood when thoroughly seasoned are almost indestructible and have been known to exist in perfect preservation for nearly 100 years. It gets extremely hard with age and then becomes almost unworkable, even strong nails cannot be driven into it and when struck the wood rings like a bell. Altogether, it is a remarkable timber and highly suited for outside works. Should any decay or destruction have occurred in the timber after having been years in use, it will always be found that this is confined to the sap-wood; which therefore ought always to be avoided in the construction of houses or in other works of a permanent character.

Unfortunately, sufficient attention is not always paid to the seasoning of the timber and hence disappointment sometimes ensues. When used as flooring boards, it should specially be thoroughly seasoned, otherwise there will be much warping, buckling, and an unsatisfactory floor altogether; if seasoned before being laid, however, a better floor could not exist.

Much has, of course, been said and written about this timber, but it is not my intention to wade through these details and give the results here; suffice it to say that it is one of the most valuable of Western Australian timbers, and the best known of all Australian timbers.

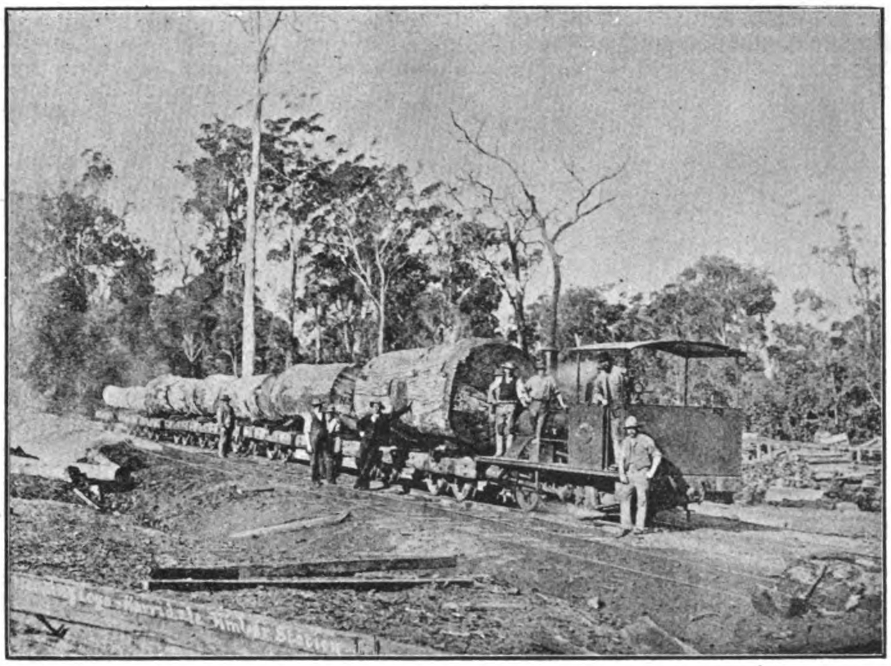
My own opinion of it is that it is one of great excellence, and may be looked upon as one of the principal timbers of Australia for general constructive purposes. I have been shown many specimens with surprising records of durability in the ground and in water, salt and fresh, and these of themselves testify to its wonderful excellence. I have, however, observed also that this timber is variable in its chief attractive properties, and that it is sometimes less durable than at others. This no doubt is accounted for by cutting at the wrong season of the year, by the character of the soil upon which it is grown, and other specific peculiarities.

The weight of the wood, when newly cut, is a little over 70 lbs. per cub. ft. which is reduced to 60 lbs. when thoroughly seasoned. It is red in color, polishes well, and is comparatively easily worked.

Some of the principal uses to which it is as yet applied are as follows:—Wood-blocking, piles, jetties, bridges, boatbuilding, posts, furniture and railway sleepers. It makes the best charcoal of any timber in the colony. Its adaptability for all kinds of out-door work is well known, and hence it is considered the staple timber of Western Australia.

The suitability of the timber for piles or any works requiring immersion in salt or fresh water has been practically noted and is worth recording. In this office there are specimens which have been obtained from piles and girders 60 years old. These were driven and used in local harbors and bridges. When obtained for the department, the timber appeared to be perfectly sound and free from any signs of decay whatever; if anything the wood seems to be harder, more solid and apparently more

MILLARS' KARRI JARRAH CO.—HAULING LOGS TO RAILWAY



MILLARS' KARRI & JARRAH CO.—LOADING LOGS FOR MILL

durable than freshly-cut timber. At all events, it seems capable of standing wear and tear for 100 years longer. From its immersion in water, it certainly appeared darker in color compared with newly-cut timber, but no decay whatever is apparent. Pieces of this wood have been converted into cups, card cases and other articles, and the polish which they have taken on is equal to, if it does not surpass, the finest old mahogany.

The records of this timber having lasted in the ground as fence-posts are almost without number, and need not therefore be particularised here.

There are instances of railway sleepers which were laid down 18 years ago and still appear as sound as ever.

KARRI.—This is the giant tree of Western Australia, if not of the whole Australian Continent. The latter remark is, however, disputed, but the assertion is made without much fear of contradiction. It comes, at all events, next to be considered as one of the principal timber trees of this colony. It is not so well known as the jarrah, owing to the limited field of its growth and the, at present, comparative inaccessibility of its haunts. I now give some particulars of the species.

The late Baron von Mueller was the first to give this tree its specific appellation (*diversicolor*), and this we are told by him bears reference to the paleness of the leaves upon their lower side, compared with eucalypts generally. The common or vernacular name is the aboriginal designation of the tree.

It is of some botanical interest to note that this tree was known for some time as *E. collosea*, referring no doubt to its enormous height, but this has been abandoned in preference to the one which it now bears.

There is much to be said in favor of this member of our forest flora. In its young stage it can hardly be beaten as a highly ornamental tree, being regular in its growth, straight, and umbrageous, its leaves changing in a few years from being of an oval shape to those long broad ones which mark its more matured condition. I consider that in this respect, and its general appearance as well, it resembles greatly the sugar gum of South Australia (*E. corynocalyx*).

There is no doubt that this is the finest and most graceful tree in the Australian forests. When matured, and has attained large dimensions, its appearance is simply grand in the extreme, and in this respect at least puts the jarrah far into the shade. The trees are almost always of straight growth, and tower skywards for great heights without having even the semblance of a branch. So marked are they in these respects that they look like a mass of upright candles.

The bark is smooth yellow-white in appearance, but not persistent like the jarrah. It, therefore, peels off in flakes each year, and thus the tree has always a clean bright appearance. In consequence of this, it is frequently spoken of as a "white gum," although generally known as the Karri.

The height of these trees is almost phenomenal and present astonishing productions of nature. As a rule, an average tree may be put down at 200 ft. in height and 4 ft. in diameter at 3 to 4 ft. from the ground, and about 120 to 150 ft. to the first branch. Trees of this size are generaly sound in every respect, and may be expeeted to turn out timber free from the usual blemishes of dry rot, gum veins, &c., to which large trees are usually subject.

Trees of the size indicated are what one usually meets with in the Karri forests, but much larger specimens are, of course, run against now and again. For instance, on the Warren River, it is not unusual to meet with trees which go 300 ft. in extreme height, over 180 ft. in height to the first limb, and from 20 to 30 ft. in circumference at the base. Of course, these are exceptional cases, but still they do exist.

The finest tree of this kind which I came across during my trip was at Karridale (M. C. Davies & Co.). This is called "King Karri," and the following are some measurements taken in connection with this great specimen:—

34 ft. in circumference at 3 ft. from the ground.
160 ft. to the first branch.
14 ft. in circumference at the first limb.
Over 200 ft. in extreme height.

From these figures it will be seen that the bole of this tree from the bottom to the first limb contains nearly 6,000 cub. ft. of timber. This means a weight of over 40 tons in all; that it would take one of our ordinary mills at least four days to convert it into sawn stuff; and that it would form about a quarter of the loading capacity of one of the ships which form the fleet of our present export timber trade. These figures speak for themselves, and need no comment. I question if there could be found appliances in the colony at the present moment to deal with this forest monarch. Similar cases might be cited, but this one will give a fair idea of the enormous dimensions to which this tree sometimes attains.

The Karri is a very rapid grower, and soon attains a great height and considerable dimensions of timber. I had several cut down with the object of counting the concentric rings in the wood, and of making some measurements and observations in regard to the species generally. The following may be taken as an average of these:—

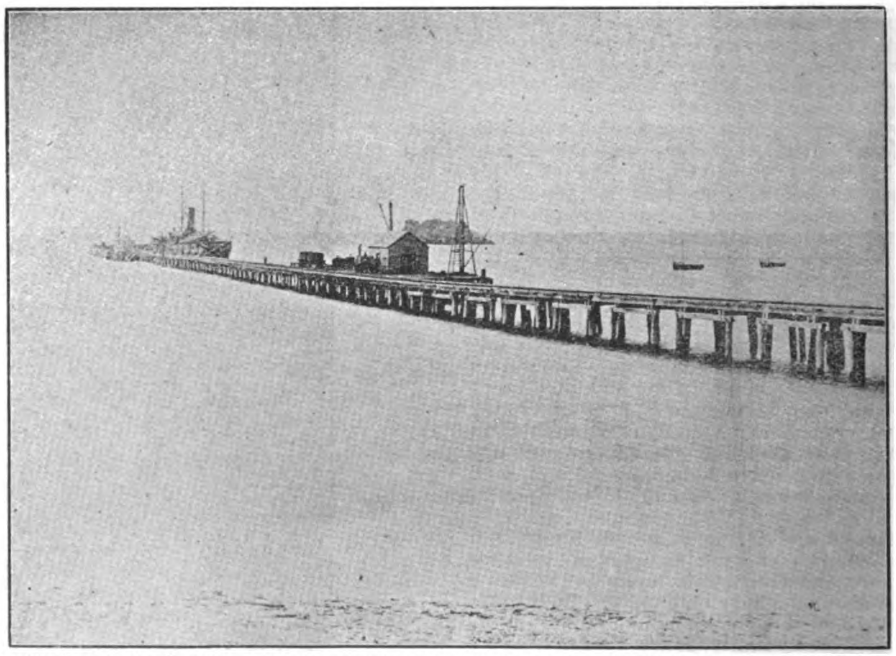
A tree on the track from Giblet's to the Vasse road was felled. It looked like a sapling in comparison with the surrounding members of the forest.

The measurements, however, were:—

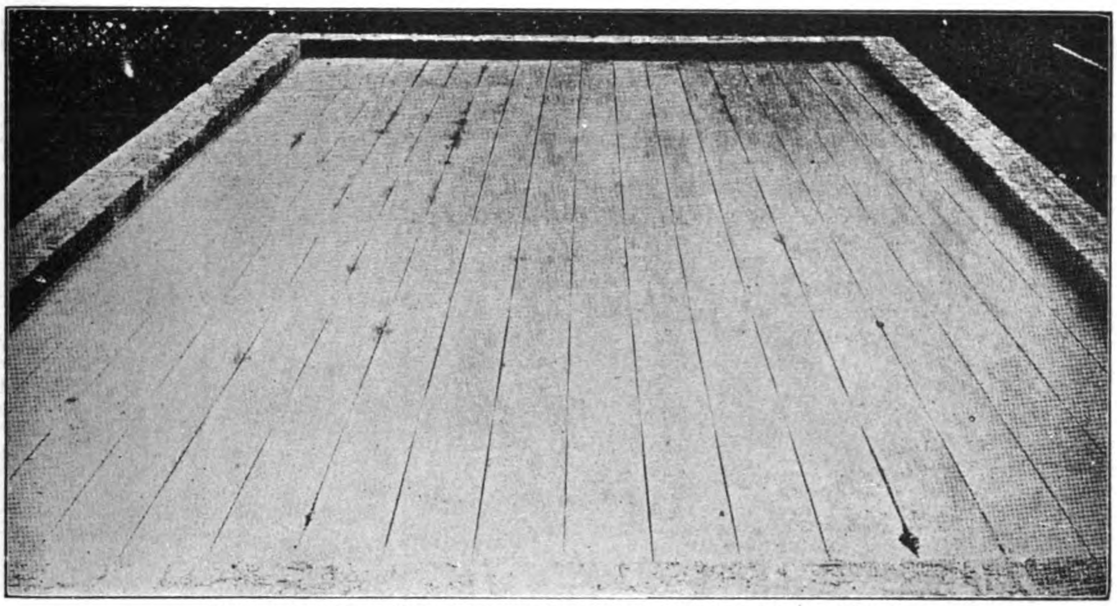
Height of whole tree........................ 153 ft.
Height to top of available timber..... 100 ft.
Thickness of bark.............................. ½ in.
Diameter at 2 ft. 7 in. from the ground... 1 ft. 11 ½ in.
Age of tree, judging from the concentric rings, 35 years.
Contents of tree, say 175 cub. ft. of timber.

We thus see that a forest of marketable Karri can be produced in the short term of from 30 to 40 years.

It is certainly a matter of local record that some years ago a resident on the Warren lived and partially raised a small family in the hollow of one of these fallen monarchs. It appears that the tree was hollow and fell, and was afterwards further worked out and lined by the enterprising settler as a dwelling for his family until such time as he was in a position to build the modern edifice which now stands not far from the site



MILLARS' KARRI & JARRAH CO.—HAMELIN HARBOR, ONE OF COMPANY'S PRIVATE PORTS



KARRI FLOOR AFTER FIRE TEST AND AFTER REMOVAL OF LOAD.

or remains of the primitive habitation. The old tree was destroyed and effaced from the place by a recent bush fire. This specimen was said to be over 300 ft. in length and some 12 ft. in diameter at the base.

The Karri is strictly confined in its range of locality to the south-western portions of the great South-Western Division of the colony, or that part of the latter lying between Cape Hamelin on the west and the Torbay Estate, near Albany, on the east. Its geographical confines are embraced within longitudes 115 degrees and 118 degrees east, and latitudes 34 degrees and 35 degrees south.

In some instances we find the tree fairly close to the sea-coast, but in such cases it is scraggy, stag-horned and branchy, and therefore not a desirable specimen for the saw mill, or readily convertible into timber for marketable purposes. Still, it is, undoubtedly, essentially a coastal tree, but yet shy of actual contact with saline particles or of strong direct sea breezes. In this respect, it perhaps also resembles the jarrah, if not the eucalyptus family generally.

In that portion of the Karri area south of the Blackwood River, the country consists of knolls and belts of red chocolate, or partial ironstone-humas soils. Around these eruptions or hills, there are low-lying parts, valleys, or swamps, which usually consist of deep vegetable debris soils, and covered with the usual tea-tree, banksias, and low eucalypti scrubs, backed up by a low inferior scrubby class of jarrah, which gradually intermixes and merges with the Karri.

As a rule, I found that in the Karri country the jarrah is subservient to the former, and therefore is inferior in every physical feature tending to natural competition as a timber tree.

Of course there are ranges and table-lands of this country which dissociate themselves from these remarks, but as a rule the latter are fairly correct.

Again, I found that the soil of the Karri belt at Karridale, or that lying between the Blackwood and the coast of Cape Hamelin, is of an entirely different nature to the other, being of a limestone formation, with the limestone on the surface, and the soil of a sandy calcareous kind. This, so diametrically opposite to the other, is a very remarkable phytological fact for future examination.

From aneroid readings, I found that the best Karri forests (that is as regards size, soundness and health of individual specimens) are to be found at elevations of from 300 to 600 ft. above the level of the sea. This I found a fairly correct observation applicable to the whole area.

Of course, in a large area of forest country such as I am now referring to, there are certain parts better than others as regards all of their natural features and surroundings, and, therefore, in coming to a conclusion as regards the best Karri forests which I have seen, I cannot but say that this is upon the Warren River, within a radius of some five or six miles of Mr. Brockman's homestead.

This, undoubtedly, is the best home of the tree, and although there may be places where there are larger members of the species, to my mind the ranges and plateaus upon the Warren River contain the best forests of this remarkable tree.

At Denmark, the property of the Millar Company, the forest of the tree is certainly very fine, and is perhaps more continuous than anywhere else; but the trees are not so high, individually, as those on the Warren.

Karridale, the concession of the M. C. Davies Company, contains some excellent timber of the species, and has the honor of possessing the largest tree of the kind represented in this report. The trees here are certainly of a high-class order in every respect, and will hold their own as regards general possibilities.

The timber is red in color, and has very much the appearance of jarrah; indeed, so like are the two, that it takes a good judge of both to distinguish each. It is hard, heavy, elastic, and tough, but does not dress, nor can it be wrought, so easily as its contemporary.

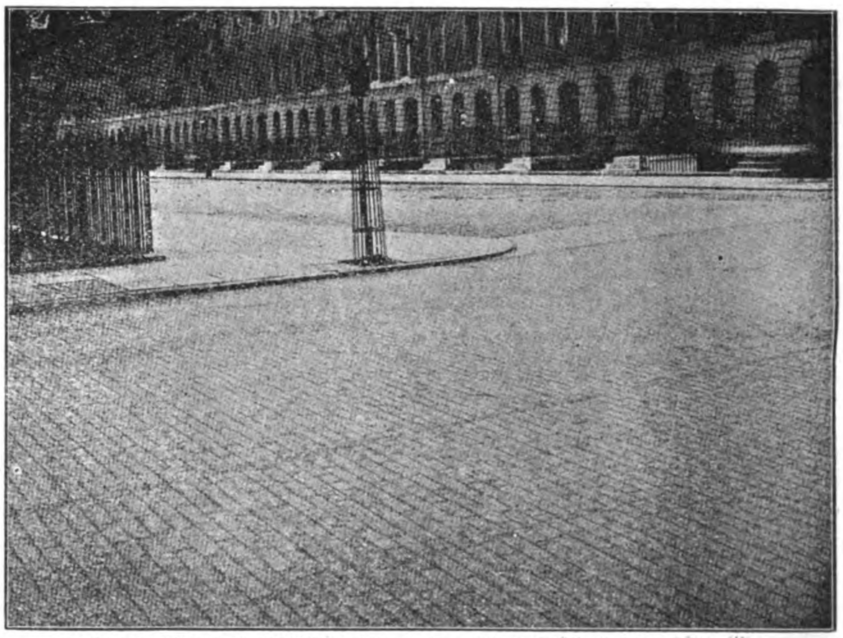
It is said that for underground or waterworks the timber is certainly inferior to some other kinds, especially to that of the jarrah, and there can be no doubt about this fact, which has been demonstrated time after time in this colony. And still it is only fair to say that instances have been brought under my notice where posts and slabs of the timber have been known to have been in the ground for 30 and 40 years with only an ordinary amount of decay. This is certainly very puzzling, and makes one doubtful in regard to the conclusions generally which have been arrived at in regard to this timber.

However, as may be seen from the comparative tests which have been made in regard to its tensile, crushing and breaking strength, it stands as a timber of a very high order indeed. We must, therefore, pending other and more general experiments, look up on the Karri timber as one best suited for superstructural works.

For bridge planking, shafts, spokes, felloes and large planking of any sort, flooring, general wagon work, beams, it is unequalled in this colony.

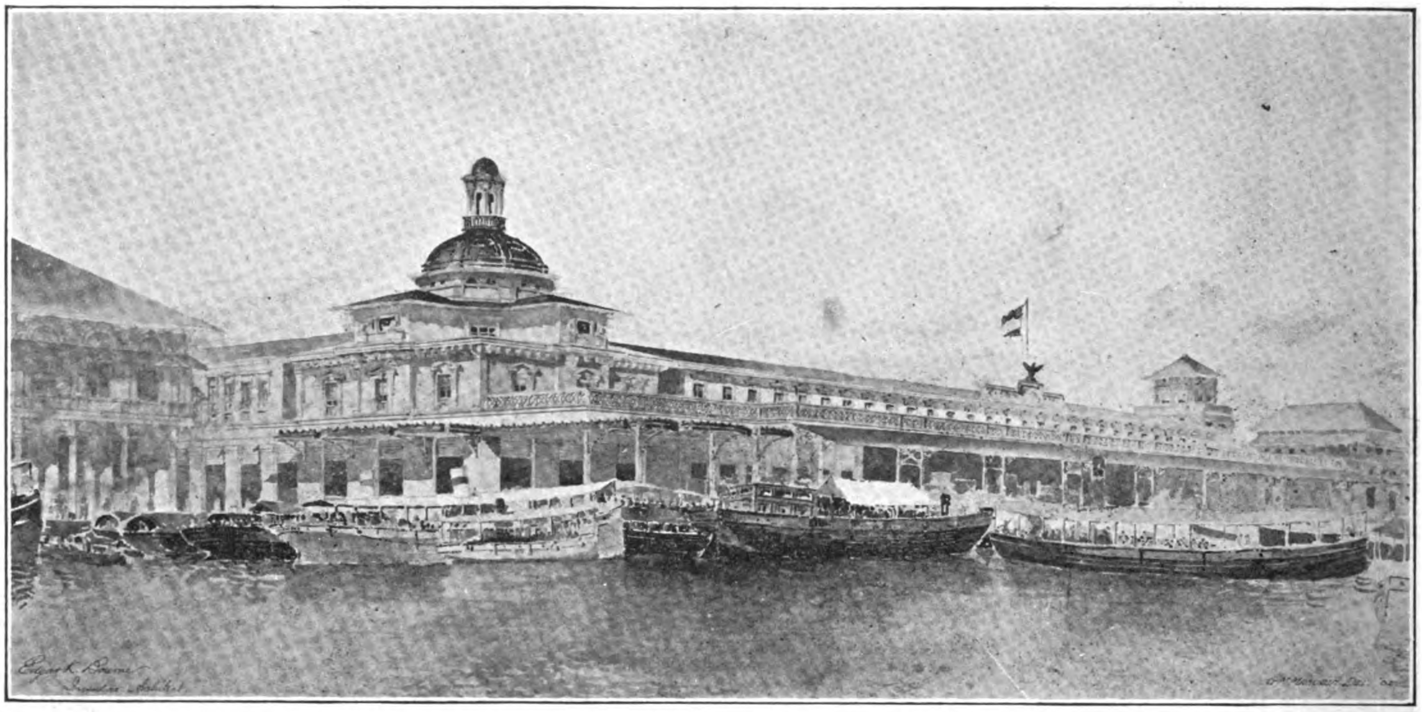
In lateral strength it is very much stronger than jarrah, and for works requiring the bearing-up of considerable weights, such as bridges, floors, rafters, beams of various kinds, it is of great value. In our railway sheds, the wood is now much in use for the construction of wagons of all sorts. It shrinks laterally but not to any great degree in a longitudinal direction. Altogether the timber is a most valuable one.

For street blocking it is most valuable, and for this purpose seems to be equal to, if not better, than its colleague, the jarrah, in that its surface by the wear caused by the traffic does not render it so slippery for the horses' feet. As is well known, this timber is now largely exported for the London street paving. It is also finding a ready sale in South Africa, for mining purposes chiefly.



TRINITY STREET, SOUTHWARK, S. E.—LAID WITH JARRAH IN 1893.

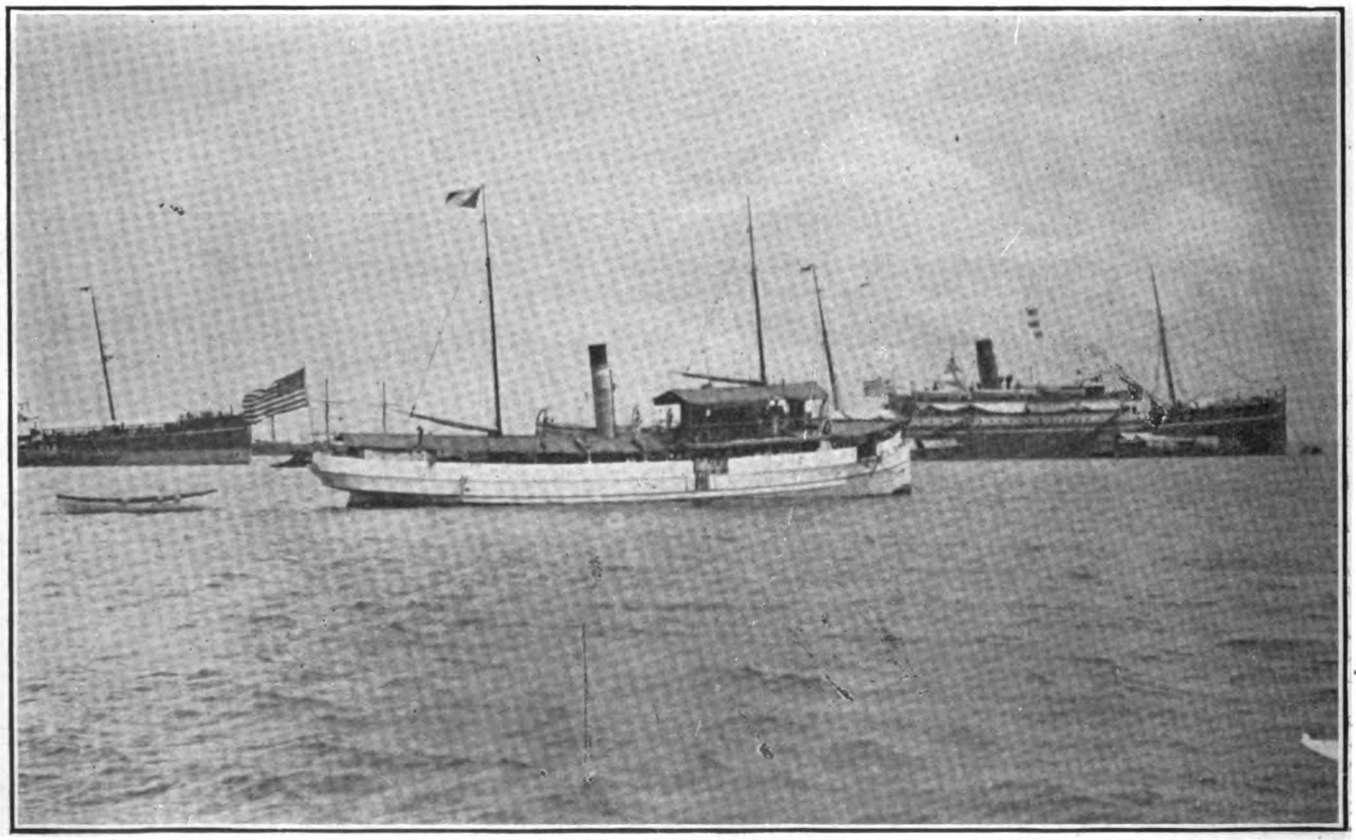
HANDLING MERCHANDISE AT THE MANILA (P. I.) CUSTOM HOUSE



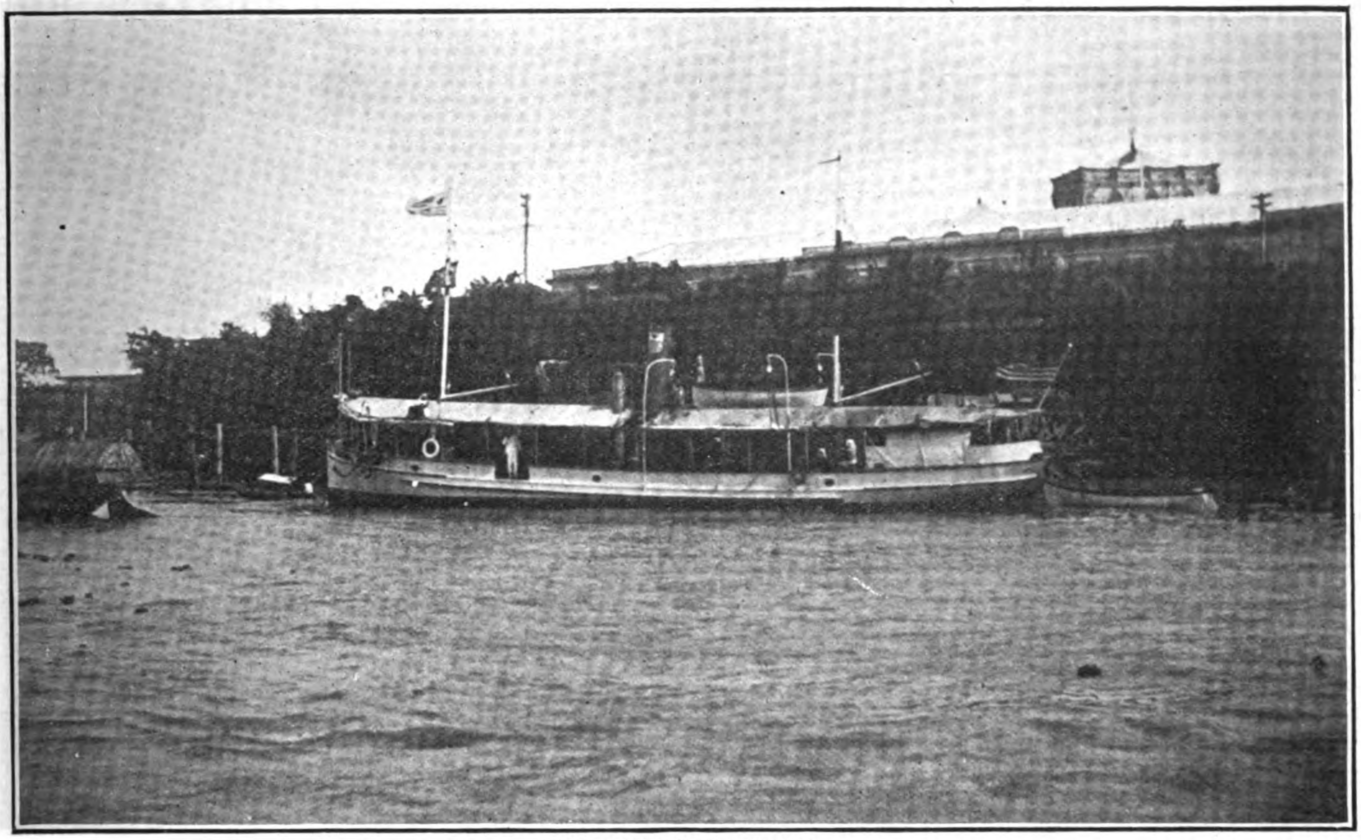
MANILA CUSTOM HOUSE

When the Philippine Government purchased the arrastre system at the Manila Custom House, in 1903, the object was to remedy the bad conditions which then and formerly existed there in regard to the delays, expense, and difficulty in discharging imported merchandise, whereby steamships were subject to great demurrage and importers to exactions and annoyances. The results accomplished, according to Mr. Clifford D. Ham, Deputy Surveyor of Customs, in charge of the "transportation of goods from one place to another," which is the meaning of the Spanish word *arrastre*, have been, in brief: (1) Ships have saved demurrage; (2) a better and more expeditious service has been given at the Custom House wharf and warehouses; (3) importers have saved much expense; (4) breakage of goods due to rough handling has been reduced to the minimum; (5) the service has been self-sustaining, and has in addition refunded the entire cost of the plant to the government. This cost was -P-39,000.

ADDITIONAL SERVICE GIVEN.—Although the arrastre rate was temporarily retained by the government at -P-1 50 per ton, much additional service was given for the same charge. Previous to the assumption of the arrastre by the Custom House the service consisted of the conveyance of the merchandise from the Custom House wharf to the warehouses and the storing therein. It ended at this point. The merchandise had been stored more or less indiscriminately, neither a ship's cargo nor individual consignments being kept together, but scattered through two, three, or more warehouses. When delivery was desired the consignee was compelled

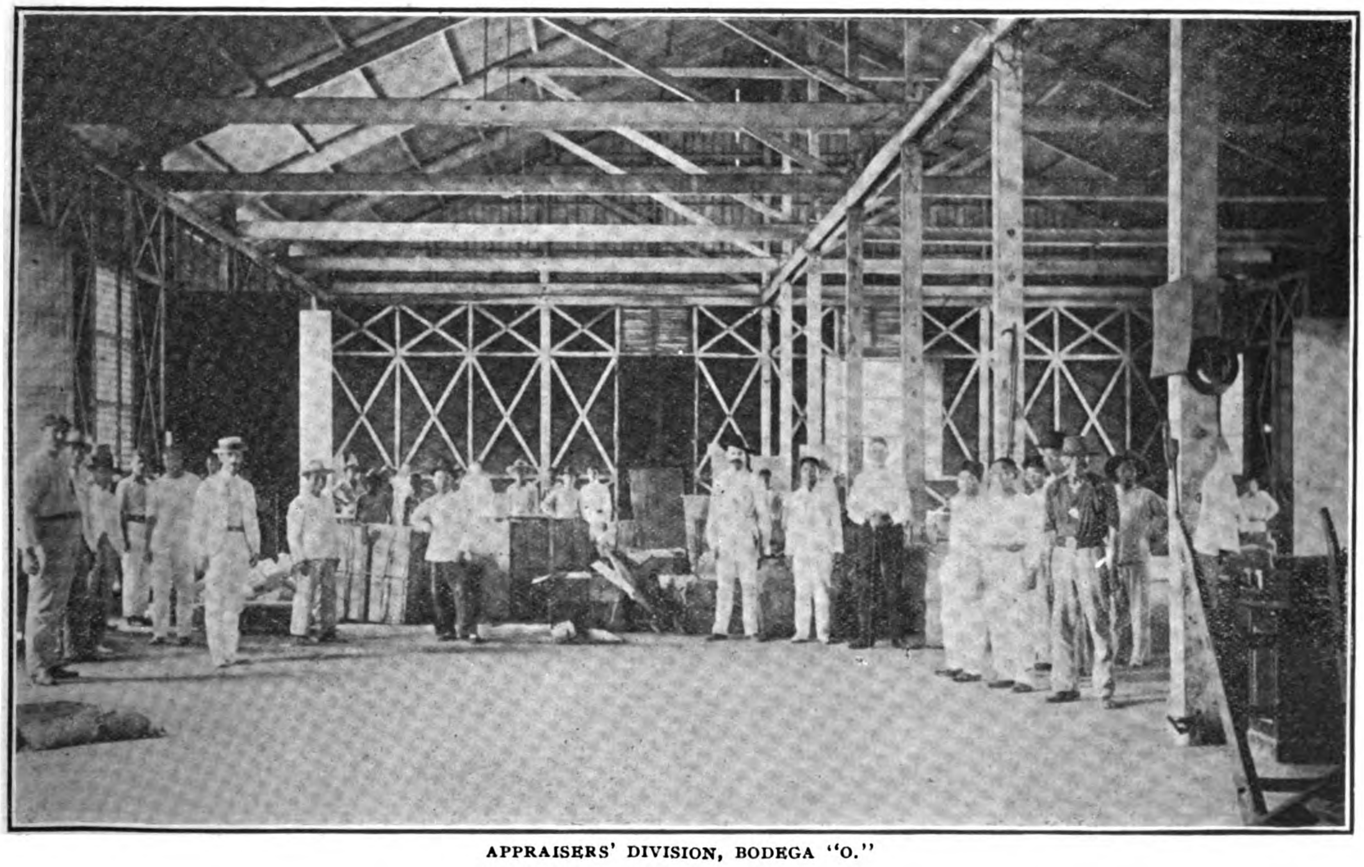


CUSTOMS CUTTER *Sula*

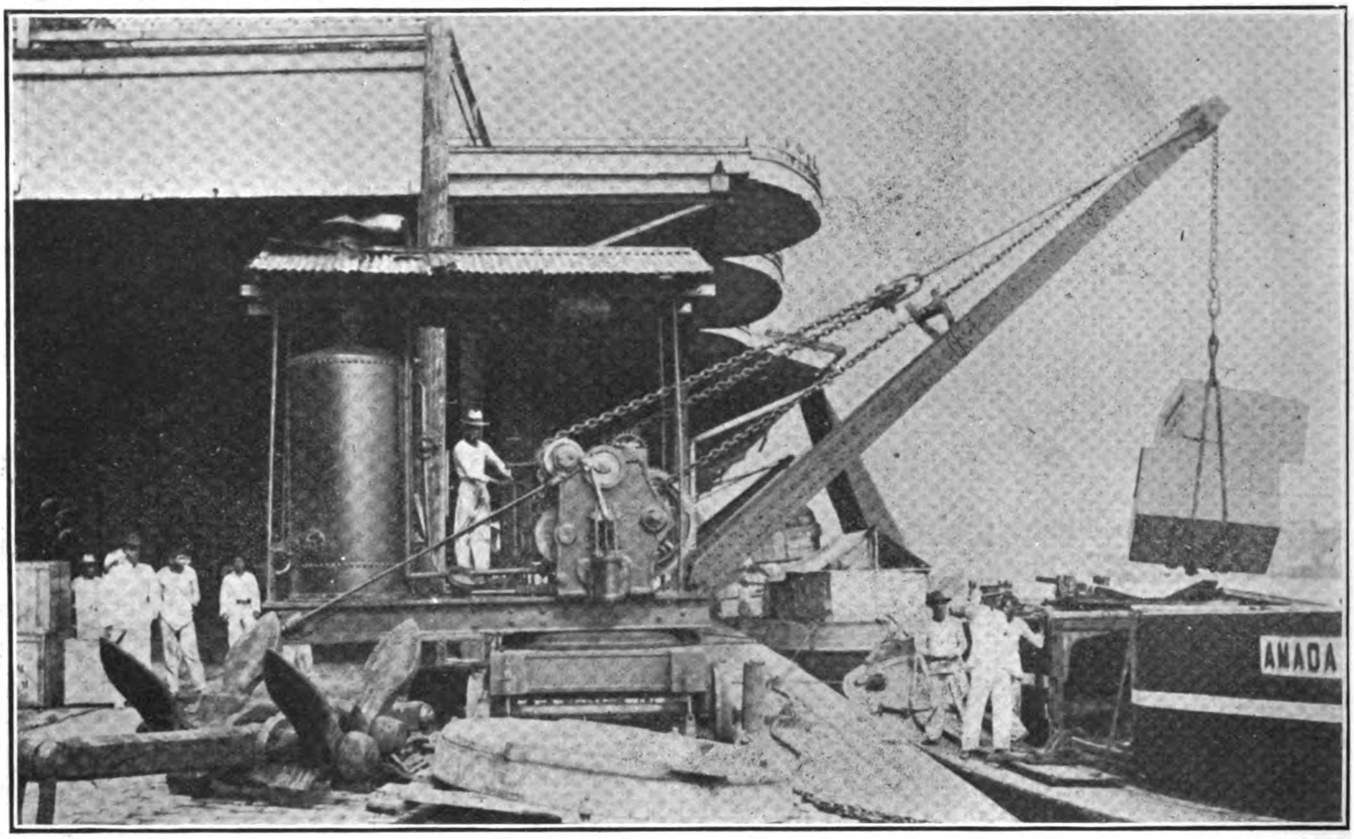


CUSTOMS CUTTER SEAGULL

to hunt out his goods, carry them out of the warehouses and put them on his carts. He was also hampered in other ways. All this work is now done by the Arrastre Division. It is estimated that this reform alone under the old charge effected a saving of about -P-41,000 a year to the importers. The charge of -P-1.50 per ton having yielded net profits the first year of the government's control of the arrastre, it was decided in 1904 to reduce the rate by 16 per cent—from -P-1.50 per ton to -P-1.25 for warehouse deliveries, and from -P-1 to -P-0.90 per ton for wharf deliveries. This reduction saves the importers over -P-22,300. It is estimated that altogether the taking over and operation of the arrastre service by the Custom House saves the importers something like -P-108,600 a year of the expense to which they were formerly subjected to, as follows: Pasé deliveries, -P-37,000; wharf deliveries, -P-8,300; warehouses deliveries and handling of small packages, -P-41,000; reduction of rate to -P 1.25 and -P-0.90, -P-20,000. Total, -P-108,600. The importers have also saved some other expenditures, especially demurrage on lighters, which can not well be computed, and it is believed have been given a greatly improved and more expeditious service, and freer from liability to breakage, than they ever enjoyed before. Moreover the saving of demurrage to steamships coming to Manila has been very considerable. It is not only a saving to the shipping of Manila in actual money, but it is a reform that wipes out an evil which



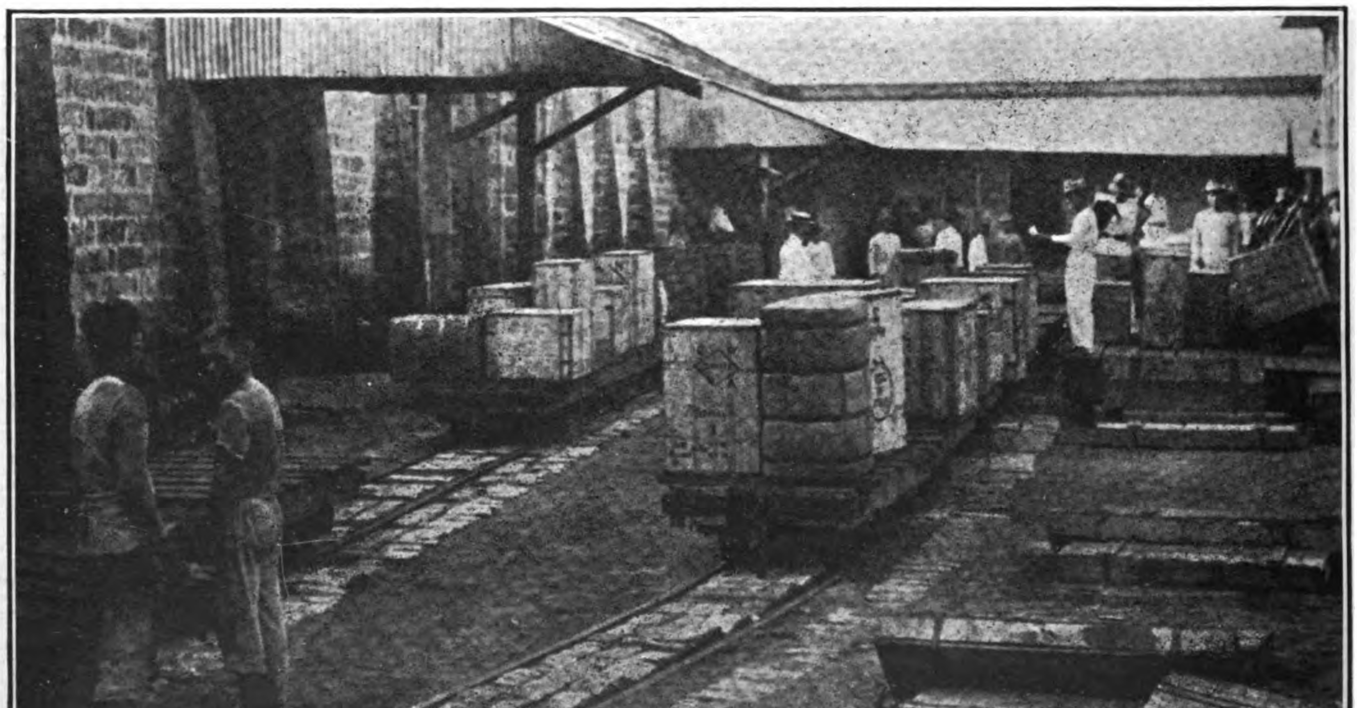
APPRAISERS' DIVISION, BODEGA "O."



CRANE DISCHARGING FROM LORCHA

contributed much in former years to giving a bad name to this port and to hampering the commerce of the Philippine Islands.

IMPROVEMENTS TO PLANT.—The plant of the arrastre system has been much improved. The locomotive in use on the tramway, a French engine of old style, being unable to haul the traffic, a new American locomotive of latest design and double the capacity has been purchased. It has the distinction of being the first American locomotive to be introduced into the Philippine Islands. The light rails of the main line of the tramway have been replaced with heavy steel rails. New tracks and switches have been laid, increasing the trackage 50 per cent and vastly improving the facilities. A firm roadbed paved with cobblestone has been constructed. Board runways with receiving and delivery platforms have been built in five warehouses, and a sixth is now being likewise improved. A track has been constructed through the appraiser's stores for the conveyance of samples direct from the warehouses. The warehouses have all been supplied with hand trucks, which the Filipino laborers handle quite well, contrary to the expectation of many. The steam cranes and other machinery have all been repaired and put in good condition. About half the customs wharf has been repaved by the Arrastre Division, and quite a number of minor improvements have been made to facilitate the work. Altogether P-13,784.42 has been expended on additions and improvements to the plant in materials, besides considerable labor.



TRAIN DISCHARGING AT WAREHOUSES

HANDLING MERCHANDISE ON CUSTOM HOUSE WHARF.

FIRE AND POLICE PROTECTION.—The Arrastre Division maintains and has charge of a system of fire protection of the custom house grounds, consisting of a reel and fire hose and barrels and buckets. It also provides four policemen and watchmen in the warehouses by day, and one on the wharf at night, in addition to the regular custom house watchmen. The division also cleans the customs wharf and grounds once or twice each day.

OFFICE AND PERSONNEL.—The entire finances of the arrastre are conducted by its own office, the collections for the charges being made by its receiving teller and deposited with the Insular Treasurer in separate account. The expenditures are made by its disbursing officer under the usual regulations. A complete system of accounts is kept in its office.

LABOR.—The laborers are all Filipinos—mostly Pampangas, Visayans, and Ilocanos—only a very few Tagalogs. About one-fourth are steady workers. Another fourth or a little more work about three to four days a week. The others come and go, working one to two or three days a week. There has never been any difficulty in obtaining all laborers needed. They do good work if plenitfully superintended, but not otherwise. They are paid 90 centavos, Philippine currency, per day of eight hours, and at the same rate for overtime, and are paid weekly. The average number employed is 125 to 150.

The skilled and semiskilled employees are paid monthly and number 65 to 70. The native assistant superintendents are paid salaries of from ₱42 to ₱50, the locomotive engineers from ₱25 to ₱50, the crane engineers ₱34, firemen ₱20, machinists ₱25 to ₱50, carpenters ₱40 to ₱50, wharf and warehouse foremen ₱30, and openers and packers ₱30.

The whole force of skilled and semiskilled employees and laborers have done good work, being well and liberally superintended.

A REPRESENTATIVE GROUP OF ARRASTRE LABORERS.

FAR EASTERN ENGINEERING AND CONSTRUCTION NEWS

PERSONAL

It is announced that Messrs. Arnhold, Karberg & Co have opened a branch at Newchwang in charge of Mr. Otto Hoppe as manager.

Mr. W. Wilson, manager of the Kowloon Docks, has been appointed acting chief manager during the absence on leave of Mr. W. B. Dixon.

It is reported that Mr. R. H. Brown is to succeed Mr. Morgan Browne as works manager on the staff of Messrs. Howarth Erskine, Ltd., in Bangkok,

Mr. J. E. Boulton has been appointed acting Assistant Director of Public Works at Hongkong during the absence on leave of Mr. P. N. H. Jones.

Mr. B W. Cadwallader, of The B. W. Cadwallader Company, Manila, and Miss. Grant, daughter of Mr. Louis T. Grant. general manager of the firm of Grant & Co., Ltd , Manila, were married recently in this city.

Mr. J. W. Davidson, late acting American Consul-General at Shanghai, and Consul-General designate to Antung, who has been suffering with typhoid fever, is now convalescent. He has sailed for the United States.

RAILWAYS, SUPPLIES, ETC.

SHANGHAI-NANKING LINE.—Four large locomotives for passenger trains, and two smaller locomotives for construction trains, for the Shanghai-Nanking Railway have arrived at Woosung.

LINE TO KALGAN, CHINA.—The Chinese Government has commenced the construction of the 120-m. railroad to Kalgan. A contract for a large portion of the rails has been awarded to a French firm.

CHINA RAILWAYS AND BELGIUM.—It is reported from Peking that the Chinese Government is borrowing a further sum of £508,000 from Belgium capitalists, for railway extension, and the agreement has been signed.

RAILWAY SURVEYS, FEDERATED MALAY STATES.—The following railway surveys will be shortly undertaken by the Federated Malay States Government:—Kuala Semantan to Kuala Lipis *via* Bentong, about 100 m ; Kuala Semantan to Kuala Lipis *via* Kuantan; Kuala Semantan to Kuala Lipis, about 70 m.

KWANGCHOW-KOWLOON LINE.—The viceroy and Governor of Kwangtung has telegraphed to the Waiwupu protesting against the grant of a concession of the Kwangchow-Kowloon railway to any foreign syndicate. The viceroy says that the Liangkwang provinces must find the money themselves and can not afford to let the line go to foreigners.

HSINNING-CANTON LINE, CHINA —Representatives of the promoters of this railway have collected over $600 000 in the United States for the enterprise, and this sum, with the money already guaranteed in Canton and Hsinning, comes up to $2,000,000. Permission for the construction of the line has already been granted by the Chinese authorities.

FREIGHT CAR ORDER, JAPAN —Five hundred gondola freight cars have been ordered by the Japanese Government, through Messrs. Mitsui & Co., from the Middleton Car Works of Middleton, Pa., which makes a total of 2,400 cars known to have been contracted for by Japan within the last 3 months. The cars will be of wood, fitted with the King patent, steel underframe.

YUNNAN RAILWAYS.—The request of the French consul at Mêng-tsz' for the employment of French engineers on the construction of the Chinese Government railways in Yunnan and Szachuan has been refused by the viceroy of Yunkui. The consul then endeavored to secure from the viceroy a promise that no foreign engineer, irrespective of nationality, should be engaged on the railways, but this request was also refused.

RAILWAY EQUIPMENT, JAPAN.—The large rush orders for locomotives and freight cars placed with American manufacturers by the Japanese Government for the imperial railways have been occasioned, it is said, by the depletion of rolling stock caused by the shipment of large quantities of equipment from Japan for the Manchurian railways. The extremely wide gauge (8 ft.) of the Manchurian lines has been reduced to 3½ ft., which renders useless the rolling stock captured from the Russians.

TIENTSIN-CHINKIANG RAILWAY.—With reference to the agreement for this line, drafted by Great Britain and Germany, the Waiwupu at Peking, in accordance with the petition of the people of Shantung Province, has communicated to the British Minister its desire to cancel the agreement, to which the British Minister replied that that was impossible, while the German Minister, after telegraphing urgently to his government, is doing his best, through the Governor of Tsingtao, to suppress the opposition in Shantung.

RAILWAY CONCESSIONS GRANTED BY CHINA.—*Chinchen:* To England and Germany; from Tientsin to Chinkiang; 600 m., capital £7,400,000. *Branch lines:* From Tichu in Shantung, to Chenting in Chihli, and from Chinting in Shantung, to Kaifeng in Honam. *Huning:* To England; from Shanghai to Kiangning, 233 m.; capital £3,000,000. *Suhangyung:* To England, from Suchau to Hangchou and to Ningpo, 1677 m. *Chinkuang:* To England, from Canton to Kowloon 90 miles. *Puhsin:* To England from Puku in Kiangning, through Anhui to Hsinyand in Honan; 333 miles. *Tsepu:* To England; from Tsechau in Shansi to Puku in Kiangning. *Tienyueh:* To France; from Annam Mentgtzu and Yunnan. The Chinese Government has Tls. 1,080,000 invested in it. *Tienmien:* To England; one from Tengyuen in Yunnan; to Burma, and one from Shunning to Burma.

RAILROADS IN CHINA.—Mr. J. W. Ragsdate, American Consul-General at Tientsin, has submitted to his government what he believes to be a complete schedule of railways constructed and projected for China. It is as follows: RAILWAYS CONSTRUCTED—*Eastern Chinese:* Russian money loaned by France; from Siberia to Yingkau. The Chinese Government has Tls 5,000,000 invested. *Southern Manchuria:* Russian capital; from Yingkau to Port Arthur and Dalney. *Chingchin:* From Peking to Tientsin, 80 m.; British capital and Tls. 2,000 000 of Chinese capital. *Chinyu:* British capital; from Tientsin to Shanhaikwan; 131 m. *Kwanwai:* British capital; from Shanhaikwan to Hsinmintun; 240 m.; cost Tls. 160,000,000. *Kwanwai Chihli:* Branch lines beyond Shanhaikwan; one from Chinhusu to Hsinmintun; one from Ninho to Nanp'ao coal mines cost Tls 1,500,000 *Chinpao:* Belgian and French capital; from Tientsin to Poatingfu. This is a portion of the Luhan line. *Luhan:* Belgian and French capital; from Lukuchiao to Hankow: 933 m. capital Tls 40,000,000 of which Tls. 18,000,000 is owned by the Chinese Government. *Luhan Branches:* From Linliho to Chukutien in Fangshan district 9 m.; from Jungtsu to (1) Kaifeng, 57 m.; to (2) Honanfu 83 m.; from Yencheng to Chuchiation 40 m.; capital Tls. 1,700 000. *Sungha:* Belgian and French (British?) capital; from Shanghai to Wusung; 10 m. Paid from the Luhan money. *Kiaochi:* German capital; from Kiaochau to Chinanfu; 343 m.; capital £15,000,000. *Lungchau:* French capital; from Lungchau in Kwangsi to Annam; 50 m.; capital Tls. 9,000,000. *Chengtai:* Russian with French capital; from Chentingfu, in Chihli, to Taiyuenfu, in Shansi; 167 m.; capital Tls. 6,849,000. *Tuehhan*—United States; from Canton to Hankow; 800 m.; capital Tls. 40,000,000.

RAILWAYS IN FORMOSA.—Mr. F. D. Fisher, American Consul at Tamsui, Formosa, in his last report says:—From January 1st, 1905, full forces have been working day and night on the construction of the section of the Formosan Government railway from the Dakusi River to Koroton, 40 m., with the expectation of opening it to traffic by April 1st. This section is a northern extension of the southern division. The principal difficulty that presents itself in this work is the crossing of the Dakusui River. On account of the force of the current during the floods and the continual changing of the channel the engineers have not as yet been able to decide upon a satisfactory plan for the construction across the stream of a permanent steel bridge, which will require a length of about 4,000 ft. However, experimental piers are soon to be constructed, which, if found satisfactory after a fair test, will be adopted in the erection of the bridge. Upon the completion of this section there will still remain a gap of about 9 m., between the northern and southern divisions of the railroad—from Hakukoko, the present southern terminus of the northern division to Koroton, which will then be the northern terminus of the southern division. On account of the extensive tunnel work and bridging to be done in this section, the two divisions will probably not be connected before the end of 1906 Eight tunnels, aggregating a length of 3¼ m., and bridges over the Taian and Taiko rivers and a branch of the latter, of 2,510 ft., 1,760 ft. and 200 ft. in length, respectively, are to be constructed within the 9 m. At present a double tramway line of 19½-in. gauge circuitously connects the two divisions of the railway, Chinese coolies furnishing the motive power. When the two divisions are joined, the main line will extend from Kilung, in the N., through the western portion of the island, to Takow in the S., a distance of about 250 m., and will afford transportation facilities between the principal ports and the developed sections of the island. Small tramways, from 3½ to 15 m. in length, reach out into the more important of the productive districts along the line. Chinese coolies furnish the motive power on these tramways, and while they are miniature affairs, having a gauge of but 19½-in. and the beds of the cars being but 4 ft. sq., they generally meet the requirements, the chief of which seems to be cheapness of transportation. The railway bureau has well-equipped repair shops at Taihoku, on the northern division, and shops suitable for making ordinary repairs at Takow, on the southern division. The Osaka Car Construction Company has branch shops at Taihoku, from which freight and passenger cars are now turned out.

ELECTRIC LIGHTING, TRACTION, POWER, ETC.

SIAMESE TRAMWAY COMPANY, LTD—The lines of this company will be opened for public traffic Sunday, October 1st. Thirty cars will be put on the run at once. The big car shed is now complete. It measures 200 ft. by 20 ft. and at the far end are three pits capable of accommodating 12 cars. The power station contains three 200 kw direct-current plants by Messrs. Bowett & Lindsay. The switchboard has three generator panels, one total output panel, three feeder panels, and one station-lighting panel. The condensers are by the Wheeler Engineering Company, the overhead traveling crane by Messrs Jessop & Appleby, and there are three Babcock & Wilcox water-tube boilers.

ELECTRIC LIGHT COMPANIES, JAPAN —There are 68 electric light companies in Japan, having aggregate authorized capital of -Y-15,428,250, of which amount -Y-12,517,1·5 is fully paid up besides -Y-1,014, 287 credited to reserve funds. The total length of electric lines is 1,459 m., or about 5,000 m. of wires. Sixty-nine thousand three hundred and twenty-eight houses are supplied with light to the extent of 296, 872 *watts*, and 8,818 street lamps are operated. The aggregate receipts amount to -Y-4,051,709 against an operating expense of -Y-2,224,145, leaving a net profit of -Y-1,827,564, of which -Y-1,380,101 was distributed in dividends last year, making an average of 11 per cent in profits on the paid up capital.

CELEBES-GUAM CABLE.—The cable steamer *Stephan*, of the North German Cable Works, Nordenham, has completed the laying of the cable between Menado, Yap and Guam, for the German-Holland Telegraph Company, of Cologne. The length of this cable is nearly 2,000 m., and its weight about 4,000 tons, and the greatest depth attained 2,300 ft. By this cable the Ducth-India colonies and the German Carolines are placed in communication with the American Pacific cable. The *Stephan* will next lay a cable 130 m in length from Shanghai along the China Coast, which will form a part of the Shanghai-Yap cable, of which the main line is now being constructed by the North German Cable Works and which, it is expected, will be laid next winter.

ELECTRIC-HYDRAULIC PLANT, JAPAN.—An order has been placed with American manufacturers for an electro-hydraulic plant for the Kanazawa Electric Light Company, Kanazawa, Japan. It will consist of a Westinghouse 120-kw, rotating armature alternator, 2,200 volts, 60-cycles, 3-phase, to be direct coupled to a 22-in., high pressure, horizontal Victor turbine made by the Platt ironworks, Dayton, O. The turbine is to be capable of developing 230 actual h. p at the shaft, under a working head of 190 ft., running at 720 r. p. m. Some of the power of this wheel will be used in operating other apparatus in addition to the 120-kw. generator. To furnish excitation a 2-kw. machine will be driven from the generator shaft. To control the above alternator and exciter, there will be a standard Westinghouse white marble switchboard, equipped with Westinghouse instruments. For governing a Lombard type "Q" 8 x 16 governor has been ordered. It is hoped to lay down the complete plant in Japan by the first part of October.

DEVELOPMENT IN INDIA —Considerable activity is being shown in India in electrical development. The Indian Electric Supply and Traction Company (Limited), with a capital of £600,000, divided into 120,000 shares of £5 each, has been formed in London, to establish and work electrical enterprises in India. Messrs Kilburn & Co. and Crompton & Co. (Limited) occupied practically the same respective positions towards the Calcutta Electric Supply Corporation (Limited), as they will occupy toward this company. The first business of the company will be to construct a tramway in Cawnpore and its suburbs, with the necessary generating station to supply electric power for working such tramway, and also to supply current for electric light and the working of fans and for other purposes in Cawnpore. Concessions have been granted by the municipal board of Cawnpore, the district board of Cawnpore and the cantonment committee of Cawnpore, these concessions being authorized by the government of the United Provinces of Agra and Oudh by orders which have been sanctioned by the government of India. The concessions provide for their early transfer to this company.

ELECTRIC TRAMWAY COMPANIES, JAPAN —The first electric tramway built in Japan is the line 8 m. in length, opened in Kyoto in 1895, during the holding of a national industrial exposition in that city. Since then other cities have adopted the system, and at the present there are 17 electric tramway companies in the empire, with an aggregate capital of -Y-36,000,000 or roughly $18,000,000 gold, operating 120 m of line, and with 85 m. under construction. Most of the companies are, however, still in the initiatory stage, and have yet to show profitable returns. The Tokyo tramways, show an annual profit of not less than 10 per cent, and it is confidently expected the other lines will prove equally remunerative.

From the recent statistics compiled by the Imperial Department of Finance, it appears that the United States leads in supplying eletric motors and cars. During the year of 1904, American manufacturers sold to Japan electrical machinery to the value of -Y-812,226, or about 66 per cent of the total imports and electric cars to the value of -Y-783,699, or about 87 per cent of the total.

Following is a list of the electric tramway companies of Japan, with authoritative date compiled by the Department of Finance:—

Tokyo Street Railway Company.—*Capital*—Authorized, -Y-15,000,000; paid up, -Y-6,000,000; reserve, -Y-23, 364. *Lines*—In operation, 10.46 m ; length of track, 20 61 m.; under construction, 4 45 m.; length of track, 9 10 m. Number of cars, 351; passengers carried, 18,937,907. Earnings, -Y-855,002; expenses, -Y-329,353; net earnings, -Y-525,650; dividends, -Y-360,000; rate, 1 per cent.

Tokyo Electric Tramway Company —*Capital*—Authorized, -Y-6,000,000; paid up, -Y-5,000,000; reserve fund, -Y-289,915 *Lines*—In operation, 12.45 m.; length of track, 21.12 m ; under construction, 0.68 m ; length of track, 0.68 m. Number of cars, 250; passengers carried, 42,350,787. Earnings, -Y-1,464,183; expenses -Y-712,404; net earnings, -Y-751,779; dividends, -Y-512, 188; rate, 11 per cent.

KAWAGOYE ELECTRIC TRAMWAY COMPANY.—*Capital*—Authorized, -Y-250,000; paid up, -Y-87,500. *Lines*—In operation, 8 m. (First year).

IWAMURA ELECTRIC TRAMWAY COMPANY.—*Capital*—Authorized, -Y-110,000; paid up, -Y-66,992. *Lines*—In operation, 7.35 m.; length of track, 7.48 m.

TOKYO ELECTRIC TRAMWAY COMPANY.—*Capital*—Authorized -Y-6,000,000; paid up, -Y-3,920,000. *Lines*—Under construction, 24.31 m.; length of track, 42.14 m.

TAMAGAWA ELECTRIC TRAMWAY COMPANY.—*Capital*—Authorized Y-400,000; paid up, -Y-100,000. *Lines*—Under construction, .08 m; length of track, .40 m.

COMPANIA GENERAL DE TABACOS de FILIPINAS, BARCELONA AND MANILA.—This company has declared a dividend of 3 per cent or 15 pesetas per share, on account of profits for 1904.

OSAKA MUNICIPAL ELECTRIC TRAMWAY.—Appropriated expenditure, -Y-139,674. *Lines*—In operation, 3.08 m. Number of cars, 5; passengers carried, 1,529,787. Receipts, -Y-49,148; expenses, -Y-30,113; net earnings, -Y-19,035.

OSAKA-KOBE ELECTRIC TRAMWAY COMPANY.—(Opened to traffic, May 1905).—*Capital*—Authorized, -Y-1,500,000; paid up, -Y-1,500,000. *Lines*—In operation, 19.01. Paid dividend of ½ of 1 per cent for 1904 from miscellaneous receipts; amount of dividends, -Y-55,978.

HOSHIO ELECTRIC TRAMWAY COMPANY.—*Capital*—Authorized, -Y-200,000; paid up, -Y-200,000. *Lines*—In operation, 7.08 m. Number of cars, 4; passengers carried, 300,861. Receipts, -Y-39,226; expenses, -Y-32,777; net earnings, -Y-6,449.

TSUCHIYA ELECTRIC TRAMWAY COMPANY.—*Capital*—Authorized, -Y-100,000; paid up, -Y-85,000. *Lines*—In operation, 1.61 m.; length of track, 2.09 m. Number of cars, 10; passengers carried, 555,098. Receipts, -Y-13,454; expenses, -Y-12,080; less carried over from previous year, -Y-1,082.

YOKOHAMA ELECTRIC TRAMWAY COMPANY.—*Capital*—Authorized, -Y-1,00,000; paid up, -Y-550,000. *Lines*—In operation, 1.58 m; length of track, 2.57 m.; under construction, 0.23 m; length of track, 3.28 m. Number of cars, 22; passengers carried, 812,130. Receipts, -Y-23,570; expenses, -Y-27,849; less, -Y-4,279.

ASTOR HOUSE HOTEL COMPANY, LTD., SHANGHAI.—The directors of this company recommend the payment of a 10 per cent dividend out of the profits of 1904, placing $10,590 to a reserve fund, and carrying forward $9,000. Ample amounts have been set aside for depreciation and bad debts.

ODAWARA ELECTRIC TRAMWAY COMPANY.—*Capital*—Authorized, -Y-875,000; paid up, -Y-810,750; reserve, Y-19,299. *Lines*—In operation, 8.05 m.; length of track, 8.79 m. Number of cars, 34; passengers carried 812,943. Earnings, -Y-90,239; expenses, -Y-56,382; net earnings, -Y-33,857; dividends, -Y-31,326; rate, 2.85 per cent.

ENOSHIMA ELECTRIC TRAMWAY COMPANY.—Capital—Authorized, -Y-200,000; paid up, -Y-200,000; reserve, -Y-1,282. *Lines*—In operation, 4.67 m.; Length of track, 5.34 m.; under construction, 1.37 m.; length of track, 1.57 m. Number of cars, 10, passengers carried, 182,446. Earnings, -Y-18,356; expenses, -Y-13,998; net earnings, -Y-4,358; dividends, -Y-2,000; rate, 2 per cent.

ISE ELECTRIC TRAMWAY COMPANY.—*Capital*—Authorized, -Y-260,000; paid up, -Y-234,000; reserve, -Y-6,100. *Lines*—In operation, 4.74 m.; length of track, 5.35 m.; under construction, 3.38 m.; length of track 6.15 m. Number of cars, 8; passengers carried, 185,651. Earnings, -Y-15,436; expenses, -Y-12,978; net earnings, -Y-2,458; dividends, -Y-8,484; rate, 4 per cent.

NAGOYA ELECTRIC TRAMWAY COMPANY.—*Capital*—Authorized, -Y-500,000; paid up, -Y-414,712; reserve, -Y-10,595. *Lines*—In operation, 3.38 m.; length of track, 7.76 m.; under construction, 3.66 m; length of track, 3.66 m. Number of cars, 35; passengers carried, 3,099,227. Earnings, -Y-69,769; expenses, -Y-46,204; net earnings, -Y-23,565; dividends, -Y-21,280; rate, 5.5 per cent

IMPERIAL CHINESE RAILWAYS.—The net half-yearly profits of the Imperial Chinese Railways for the six months ended March 1st, amount to a little over £325,000, and if the rate of progress is maintained, as is confidently expected, the year's profits will, even after paying interest on the loan and providing the stipulated sum for amortization, amount to over £600,000.

OSAKA SHOSEN KAISHA.—The total receipts of this company from January to June last, inclusive, were -Y-5,371,000 while the business expenditure for the six months reached the figures of -Y-4,190,000, the net profits being -Y-1,181,000. The company has now a fleet of 94 steamers, with a gross tonnage of 90,626 tons, exclusive of a number of foreign steamers under charter.

TOKIO-YOKOHAMA ELECTRIC TRAMWAY COMPANY.—*Capital*—Authorized, -Y-2,550,000; paid up, -Y-1,275,000; reserve, -Y-9,738. *Lines*—In operation, 10.60 m.; length of track, 17.6 m; under construction, 6.78 m.; length of track, 13.76 m. Number of cars, 44; passengers carried, 1,490,801. Earnings, -Y-126,261; expenses, -Y-71,328; net earnigs, -Y-54,938, dividends, -Y-54,349; rate, $5.30 per cent.

KYOTO ELECTRIC TRAMWAY COMPANY.—*Capital*—Authorized, -Y-1,200,000; paid up, -Y-900,000; reserve, -Y-55,390. *Lines*—In operation, 15.31 m.; length of track, 19.28 m.; under construction, 8.18 m.; length of track, 3.45 m. Number of cars, 38; passengers carried, 3,553,612. Earnings, -Y-148,208; expenses, -Y-111,179; net earnings, -Y-37,030; dividends, -Y-26,200; rate, 2.80 per cent.

PORT WORKS, DREDGING, DOCKS, ETC.

DREDGING AT TIENTSIN.—A bucket dredger has commenced to deepen the channel in the Pei Ho at Tientsin just above the International Bridge.

YOKOHAMA HARBOR.—The work of dredging this harbor, in the opinion of those acquainted with the conditions, will not make much progress unless the expenditure of -Y-100,000 per year is increased by the government.

DREDGING AT CANTON, CHINA.—The dredger *Canton River* is employed at Canton removing barriers for the Imperial Chinese Maritime Customs, for which work she is still under charter from the Hongkong and Whampoa Dock Company. Further employment at Canton is in prospect.

DREDGING, HONOLULU HARBOR.—The bid of the San Francisco Bridge Company of 24.87 cts. per cu. yd., for dredging about 1,500,000 cu. yds., from Honolulu Harbor, has been recommended to the Government at Washington for acceptance.

SHIPBUILDING, MARINE, ETC.

RUSSIAN MINES ADRIFT.—It is reported that there are a large number of Russian mines adrift on the Japan Sea, having floated off the sunken warships.

STRANDED SHIP FLOATED.—The French steamer *Bin Thuan*, stranded off Hokkaido, has been floated off by blasting the rocks, and now lies at Otaru for repairs.

TREASURE THROWN OVERBOARD.—It is reported that the Russian warship *Orel*, of the Baltic Fleet, threw overboard 1,500,000 roubles before she surrendered to the Japanese.

GERMAN STEAMER CONFISCATED.—The German steamer *Vega*, 2,562 tons, has been definitely confiscated at Sasebo, Japan, with her cargo of 3,616 tons of Cardiff coal for Vladivostock.

RUSSIAN STEAMER "SUNGARI."—The Russian steamer *Sungari*, generally believed to have been hopelessly destroyed at Chemulpo, is now in the Japanese service, renamed *Shoko-maru*.

"OWAN-MARU" AGROUND.—The Nippon Yusen Kaisha's steamer *Owan-maru*, 629 tons net, from Mororan to Hakodate, went aground in a fog recently. It is hoped that the hull will be refloated.

CHINESE CRUISER, "KIANG YUAN."—This new war ship, built by the Kawasaki Dock Company, Kobe, is fitted with twin screws and seems to be a speedy craft. She is anchored at the Kiangnan Arsenal.

STEAMER CHARTERS, JAPAN.—The British steamers *Victoria* and *Ganges*, and Japanese steamers *Tamon-maru* and *Nanawa-maru* have been chartered to the Nippon Yusen Kaisha for the company's home services.

BATTLESHIP "OREGON," U. S. NAVY.—It is announced from Washington that the battleship *Oregon*, now stationed in Asiatic waters, is to have a general overhauling at Bremerton. Her complete overhauling will require several months.

COLLISION IN JAPAN WATERS.—The steamer *Konoura-maru* came into collision recently with the *Zencho-maru*, between Tsushima and Iki. The latter steamer was sunk. She was a vessel of 323 tons and owned by Mr. Ikeda of Saga, Japan.

STRANDED "ROMULUS" SOLD.—The stranded steamer *Romulus* (German) has been sold to Mr. Ooka Kaso of Hachinohe, where she lies stranded, for -Y-28,065. She is a vessel of 2,640 tons and had 3,500 tons of Cardiff coal for Vladivostock.

MOTOR BOATS, JAPAN.—The demand in China for motor boats promises to be very bright. The whole of China is a network of rivers and canals upon which this class of craft, especially boats of light-draught capacity, can be operated.

NEW KOBE-SHANGHAI LINE.—It is announced that Mr. Deshler of Kobe, who has established a maratime service between Kobe and Chinnanpho with the steamer *Ohio*, has decided to open a new line between Kobe and Shanghai *via* Chemulpo, with three steamers.

KAWASAKI SHIPBUILDING COMPANY, KOBE.—This company has at present two steamers under repairs at its dockyards and two *Nippon Yusen Kaisha* and *Orizo Kisen Kaisha* steamers under construction. There are over 6,000 workmen employed at the company's dockyard and engine works.

YACHT CONSTRUCTION, JAPAN.—A yacht for the use of the crown prince of Siam has just been built at the Kawasaki Dockyard Company's works. She is 132 ft. 6 in. in length, 11 ft. in breadth, and the speed is 10 knots. The internal fittings and furnishings are said to be luxurious.

STEAMER FOR F. M. S. RAILWAYS.—Messrs. Riley Hargreaves & Co., Singapore, have secured the contract for the construction of a steel twinscrew passenger and towing steamer for the Federated Malay States Railways to be used between Penang and Prai. The vessel will cost $70,000.

LAUNCH OF A STEAMER, JAPAN.—A steel steamer of 1,250 tons was recently launched at the Osaka Iron Works. The vessel has been built to the order of the Osaka Shosen Kaisha and will ply between Japanese ports and Tientsin. She is of shallow draught and will be able to go right up the Pei-ho and lie alongside the wharf at Tientsin.

"ROHILLA" AND "ROSETTA" SOLD.—The *Rohilla-maru* and the *Rosetta-maru*, which were purchased by the Toyo Kisen Kaisha from the Peninsular and Oriental Steam Navigation Company, have now been resold to the *Orizo Kisen Kaisha*. The vessels are now in the service of the Japan Red Cross Society. They are intended for the South American service which the *Oriao Kisen Kaisha* has decided to open.

HONGKONG-WHAMPOA DOCK COMPANY.—This company has installed an electric drive in the boiler shop and shipyard with satisfactory results. Several more motors will be required for this department before it is complete. Two new electric cranes have been fitted in the machine shop. The new drawing office in Kowloon is practically completed and the entire technical staff of the company is now located there.

NEW STEAMERS, C. P. RAILWAY COMPANY.—This company is reported to have arranged to construct three passenger steamers from 14,000 to 15,000 tons gross each, for its steamship service between Hongkong and Vancouver. When these vessels are completed and placed in the service, the *Empress of India*, the *Empress of China* and the *Empress of Japan*, it is stated, will be transferred to the Australian service.

SOLD TO JAPAN.—The steamers *Gisela* and *Gota* have been sold to the Nippon Yusen Kaisha for the Company's Hokkaido service. They are sister ships of 1,536 tons each. The same company has purchased the steamers *Grafton* and *Mazagon* from British shipowners. These vessels are on their way from London to Kobe. The *Standard* and another Norwegian steamer, under charter to the Osaka Shosen Kaisha, have now been sold to the Japanese Steamship Company. The *Standard* has been renamed the *Fukushu-maru*, and the other, the *Oushu-maru*, by the purchasers, who will place them in their Korean service.

NO BIDS FOR PACIFIC FREIGHT.—The War Department is without bids this year for the transportation of freight from Pacific Coast ports to Manila. Last year the Pacific steamship companies made satisfactorily low rates for carrying government freight to Manila. This afforded some critics of the army transport system an admirable opportunity to make comparisons of the cost, to the detriment, it was alleged, of the army transports, and altogether in favour of the contract system of transportation of freight and passengers. Lately the Pacific liners found it impossible to take a cargo to Manila, and one of the transports held in ordinary was placed on the active list for transportation purposes. With the failure of the steamship company to send a bid to Washington, it is quite evident that they desire to place the government on the same footing as commercial shippers. If this is done, of course, a very attractive comparison which the jugglers of figures have been able to make in favor of the commercial liners will no longer be possible even by exercise of a vivid imagination.—*San Francisco Chronicle.*

NOVEL ENGINEERING FEAT.—An interesting piece of work has just been completed at the Burma Oil Company's depot at Budge-Budge, Burma. This was the shifting of three large kerosene oil tanks from their original positions to new sites 300 yds. away. The tanks, which are each of a capacity of 500,000 gals. of oil, and of the usual cylindrical pattern, measure 30 ft. in height and 58½ ft. in diameter and with ballast weighed about 140 tons each. The first step in the work of removal was to build two parallel "bunds," so as to form a canal along which the tanks were floated by a circuitous route to the new sites. Into this canal 5,000,000 gals. of water were pumped, at the rate of 100,000 gals. per hour by the port commisioners' firefloat *Hetty*, and the pumps of the Burmah Oil and Standard Oil depots. As soon as there was sufficient depth of water in the canal, the tanks, which drew about 22 in., were floated off and separately towed along by coolies. Piles previously placed in position limited the motion and aided in leaving the tanks securely anchored exactly where they were wanted over their new foundations. The water was then let out, and the tanks settled down into their places without a hitch of any kind, the work of actual removal having taken only 2¼ hrs. We believe we are right in saying that this is the first time that large tanks have ever been removed by floating; ballasting with sand loaded to a parabolic curve being the method employed to prevent floor-plates from dishing.

PUBLIC IMPROVEMENTS.

PUBLIC IMPROVEMENTS, SINGAPORE.—The administration report of the Singapore municipality for last year has just been made public. Five hundred and fifty thousand dollars have been allotted as follows—Stamford road canal, $25,000; new water mains $60,000; completion of filters 11 and 12, $10,000; purchase of Worthington pumps, $82,000; electric power installation, $150,000 raising dam impounding reservoir, $30,000; new cinerators, $60,000; Mahomedan cemetery, $68,000; Tanjong Katong roads, $40,000; cantonment road, $25,000. No provision has been made in this loan for any further sum required for the Kalang Extension waterworks, or for the new bridge over the Singapore River for neither of which works revised estimates have yet been submitted. *Engineer's Department.*—The expenditure of this department in 1904 was $1,683,335, an increase of $635,538 compared with 1903. *Roads and Streets.*—At the end of the year there were 27.48 m. of granite road and 69.04 m. of laterite road within

municipal limits. The total quantity of metal spread on roads was 140,640 cub. yds or 1,457 cub. yds. per m., as against 1,051 cub. yds. per m. in 1903. During the year 31.28 m. of road were remetalled, 10.01 m. with the granite and 21.27 m. with laterite. *Waterworks*.—There are about 62 m. of distributing mains of 3 in. diameter and over. *Kallang Tunnel*. The total length of the tunnel completed up to the end of the year was 474 ft. out of a total of 1,300 ft. Messrs. Howarth Erskine, Ltd., are the present contractors.

MINES AND MINING.

PROSPECTING LICENSES, BURMA.—The Burma Government is granting new prospecting licenses over certain blocks of the Yenangyaung oil fields in the Magwe District.

RUBY YIELD, BURMA.—The Magok mines, the property of the Burma Ruby Mines, Company, are reported to have yielded rubies to the extent of 205,294 carats in 1904.

BURMA GOLD DREDGING COMPANY.—This company, which is the pioneer of the industry in Burma and has an important concession on the Irrawaddy River, has established its head office at Myitkyina, Upper Burma.

GEOLOGICAL SURVEYS, MYSORE.—Recent geological surveys in the Shimoga and Mysore Districts of Mysore have resulted in the discovery of valuable deposits of manganese ore and magnesite which the State Geological Department will probably take steps to exploit.

RICH COAL MINE, PEKING.—A rich coal mine in the village of Tzuchaiwu, in the Western Hills, Peking, is about to be worked. A Belgium engineer who surveyed the mine estimates the output at 2,000,000 catties a day.

TIN OUTPUT, F. M. S.—The tin statistics for the first half of the current year show that the total output of mines in the Federated Malay States during the period, in piculs, was 419,084.53, an increase of 13,896.65 piculs over that of the corresponding period in 1904.

LEAD SMELTING, BURMA.—The Great Eastern Mining Company, Ltd., which has a concession for lead mining in the Northern Shan States of Burma, has also been permitted by the authorities to mine for limestone and ironstone, the latter for employment as a flux for lead smelting.

MINING INDUSTRY, JAVA.—Gold mining progresses slowly but steadily in Java. The Redjang Lebong mine is still the most prosperous and a dividend is expected to be declared as a result of the 1904 working. The Ketahoen and Tokok mines are beginning to do well. A concession has been granted to a company for the exploitation of beds of magnetic iron sand lying in the neighborhood of Tjilatjap, south coast of Java.

KOLAR GOLD FIELDS, INDIA.—Following are the returns for the month of July, 1905:—

Balaghat.—4,100 tons of quartz crushed yielded 3,278 oz., and 2,750 tons of tailings cyanided yielded 269 oz., making a total of 3,547 oz of gold as compared with 3,426 oz., in June. *Champion Reef*.—Milled 19,320 tons which produced 15,877 oz., and 16,374 tons of tailings treated by the cyanide process produced 2,185 oz., making a total of 18,012 oz. of gold, as compared with 18,410 oz., in June.—*Mysore West*.—Mill ran 714 hrs., crushed 2,162 tons and yielded 1,032 oz of bar gold. *Nandydroog*.—6,300 tons of quartz crushed yielded 5,091 oz. and 7,020 tons of tailings cyanided produced 663 oz., making a total of 5,754 oz. of gold as compared with 6,154 oz., in June. *Ooregum*—Stuff crushed 10,300 tons, gold produced 4,444 oz. and slimes and tailings cyanided 10,061 tons. Yielded 1,043 oz. making a total production of 5,487 oz., as compared with 5,485 oz., in June. The net imports of gold into India during the month of June were 69,612 oz. and that of silver for the same period 6,057,066 oz. *Hutti*—(Nizam's). 1,106 oz. of gold from 2,025 tons of quartz crushed. *Mysore*.—16,600 tons of quartz crushed produced 15,420 oz., and 13,650 tons of tailings cyanided yielded 1,834 oz., making a total of 17,254 oz. of gold as against 17,051 oz., in June.

NEW MINING LAWS, JAPAN.—The old mining regulations of 1890 for Japan were superseded last (July) month by a new mining law. The Minister of Agriculture is empowered by this law to permit, cancel or suspend the right of mining, permanent or trial. For purposes of administration of the mining industry, the whole country is divided into five districts, each under a mine inspection office. The area of a mining set must be, for colliers not less than 50,000 *tsubo* (about 41 acres), and for other mines not less than 5000 *tsubo* (about 4 acres), nor exceed for mines of all kinds 600,000 *tsubo* (about 490 acres). Japanese subjects and juridical persons constituted conformably to the laws of the empire may acquire mining rights. Mining rights are classed as real rights to which the provisions relative to immovable property are correspondingly applicable, and they are indivisible. They can not be made subjects of rights other than those of succession, transfer, measures taken in consequence of non-payment of national taxes, and execution; but the right of permanent mining may become the object of a mortgage. The duration of a right of trial mining is two years from the date of the registration thereof. A mining mortgage law, which enables holders of mining rights to create mining foundations with a view to the mortgage thereof, operates in connection with the new mining law. A mining foundation is formed with the following, which belong in connection with mining to the owner of a mining right:—(1) Mining right; (2) land and works; (3) superficies and right of use of land; (4) right of hiring things, to which the letter thereof has given his consent; (5) machines, instruments, vehicles, vessels, oxen, horses and other appurtenances.

FINANCIAL NEWS.

JAPAN BREWERIES AMALGAMATION.—The amalgamation of the three beer brewing companies of Japan, Yebisu, Asahi, and Sapporo, is to be followed by an increase of capital to -Y-5,000,000.

PHILIPPINE AND MANILA BONDS.—The Secretary of the Treasury at Washington announces that, beginning on August 1st last, Philippine and Manila Bonds, amounting to $13,500,000, will be accepted by the treasury for existing government deposits instead of United States bonds, provided that United States bonds are released immediately and used as a basis for additional bank note circulation.

ENGINEERING AMALGAMATION, SINGAPORE.—At an extraordinary general meeting of shareholders of Messrs. Riley, Hargreaves & Co., Ltd., of Singapore, held recently, it was the unanimous decision of those present that the undertaking of the company should be amalgamated with that of Messrs. Howarth Erskine Ltd., and that a new company should be formed for the purpose of acquiring the property and liabilities of Messrs Riley, Hargreaves & Co. and Messrs Howarth Erskine Ltd.

NORTH BORNEO TRADING COMPANY.—This concern's report for the year 1904 shows that there was a credit balance on the year's working of £247. This, together with the balance from the previous year of £2,476, makes a credit total of £2,723 which is carried forward. Nothing is reserved for depreciation of plant; but £400 have been written off the launches account for the loss of the steamer *Segaliud*, sunk in the great gale of November, last, and on account of the *Eleanor*, broken up.

HONGKONG COTTON SPINNING, WEAVING AND DYEING COMPANY, LTD.—Messrs Jardine, Matheson & Co., general managers of this company, made their report to shareholders at the eighth ordinary meeting the fore part of the current month. The balance at credit of profit and loss account is $178,264.32, which has been appropriated as follows:—To pay a dividend of 10 per cent for the year, $125,000; placed to equalization of dividend fund, $30,000; carried forward to credit of current year's account, $23,264.32.

WIRELESS TELEGRAPHY, U. S. NAVY.—The Navy Department at Washington is arranging to carry out a plan for establishing wireless telegraph communication from the Philippines to San Francisco. The power of stations will be increased so as to maintain unbroken ranges of communication from Cavite to Guam, thence to Midway and Hawaii, and between those islands and San Francisco. This last stretch is more than 2,000 miles, but it is believed that, if the physical obstacle in the Hawaiian Islands can be overcome, there will be no difficulty in establishing communication.

KAWASAKI DOCKYARD COMPANY.—The profits of this Japanese company for the half year just ended have been declared at -Y-287,696, showing an increase of -Y-97,651 over the profits for the corresponding period last year. A dividend is declared at the rate of 12.5 per cent per annum, absorbing -Y-161,200, and -Y-5,000 is distributed among the employés as a bonus, -Y-28,000 have been placed to the general reserve, -Y-31,200 to the special reserve, -Y-20,000 to the reserve for despreciation and the balance of -Y-41,496 is brought forward to next account.

HONGKONG-WHAMPOA DOCK COMPANY, LTD.—The report of the board of directors of this company to the shareholders, at the ordinary half-yearly meeting, just held, shows that the net profits for the period, after paying interest due and all charges, amounted to $328,200.51, to which has been added the balance brought forward from last account, amounting to $498,289.10. Ten thousand, seven hundred and fifty dollars were deducted for directors' and auditors' fees, leaving available for appropriation $815,739.61. A dividend for the half-year of 12 per cent or $300,000 will be paid to shareholders, and $14,407.34 written from the value of the Kowloon docks, leaving a balance of $501,332.27 to the new account.

REFRIGERATING ENGINEERS, AMERICA.—THE FAR EASTERN REVIEW received recently a copy of the first year book of the American Society of Refrigerating Engineers, which contains much of interest relative to the organization. Anyone can receive a copy by addressing the secretary at the office of the organization, Suite 806, No. 258 Broadway, New York City. The object of the society is to promote the arts and sciences connected with refrigerating engineering. The principal officers are Mr. John E. Starr; New York City, president; Mr. H. B. Roelker, New York City, and Mr. P. D. C. Ball, St Louis, vice-presidents; Mr. Walter C. Reid, New York City, treasurer, and Mr. William H. Ross, New York City, secretary.

MANILA RAILWAY COMPANY, LTD.—For the period to December 31st, 1904, the traffic receipts amounted to -P-1,475,969, and the expenditure in Manila to -P-660,734, leaving a balance of -P-815,245, which at 2s exchange amounts to £81,524, and deducting the charges in London, etc., the net revenue amounts to £77,708. Interest has been paid on the first mortgage registered stock and on prior lien bonds, A and B., absorbing £12,000. The revenue being in Philippine currency, the comparison with the previous year's figures, although showing a decrease in pesos, gives a small increase after conversion into sterling. The claims of the company against the governments of the United States and the Philippine Islands have not yet been admitted, and are now in charge of the British ambassador in Washington. The company's claims on the Spanish Government are still pending, but for a considerable proportion an early settlement is promised. The company's system at the end of 1904 consisted of 170 m. open to traffic, and 43¼ m. under construction.

FOREIGN CAPITAL IN JAPAN.—Laws have been passed by the diet which has just risen which show a real desire on the part of Japan to offer reasonable inducement to the foreign capitalist. Hitherto the holders of so-called debentures in this country have had no rights beyond those of any ordinary outside creditor of the company, and their security has therefore been no better than that of preference shareholders in other countries. Under the various mortgage laws just passed holders of debentures issued in accordance with their provisions will have a prior lien on the property, land and plant, against which the debentures are issued, and by another new measure, known as "the law of trust for secured debentures," they will be able, in the event of default either of interest or principal, to exercise their rights of foreclosure through a "trust" company corresponding in large measure to the trustees for the debenture holders in British practice. Any company, limiting its operations to banking and trust business may undertake this function provided it is domiciled in Japan with a capital of -Y-1,000,000 (£102,000), of which half must be paid up. The total sums which may be borrowed under the proposed laws are fixed at the equivalent of the paid up share capital less the amount of loans already obtained.—British Consular Report.

INSURANCE COMPANIES IN JAPAN.—According to the *Financial and Economical Annual of Japan*, 1905, insurance companies on the European system were first organized in that country about 1881, but for some years subsequent thereto there were no regulations for the supervision of these companies. The Commercial Code, which was promulgated in March, 1890, contained detailed provisions for the conduct of insurance business, but as that code had to be revised before it could be brought into operation, the provisions in question never came into force in their original form. In March, 1899, the present Commercial Code was put in operation. Among other things it laid down the law respecting insurance contracts, and was followed in the ensuing year by the Insurance Business Law, which provides for the control and supervision of insurance companies. Insurance business, under this law, may be carried on either by a joint stock company or on the mutual plan. In either case special permission is needed for business. The capital of a joint stock company and the fund of a mutual company must be not less than -Y-100,000, and a company of neither description is permitted to engage at the same time in any other business in addition to that of insurance. Special regulations were issued by imperial ordinance in 1900 for the supervision of foreign insurance companies so far as concerned their business in Japan.

MISCELLANEOUS NOTES.

STOVES AND HEATERS, CHINA.—There is a great demand for stoves and heaters of American make in many portions of China.

ACETYLENE LIGHTING SYSTEM, CHEFOO.—An illuminating plant embodying improvements in acetylene generation has been installed with great success in Chefoo, North China.

ICE-MAKING PLANT FOR BAGUIO ARMY POST.—The War Deparment at Washington has purchased a 1¼ ton ice-making plant from the Vulcan Iron Works, San Francisco, for the army post at Baguio, Benguet, P. I.

FORMOSA SUGAR.—The shipment of sugar from Formosa between November and June last, amounted to 635,650 piculs—3¨5,280 piculs from Anping, and 320,370 piculs from Takao—valued at -Y-5,240,000. The stock now remaining in the island is estimated to be no more than 40,000 piculs.

ICE PLANT FOR JAPANESE.—The Vilter Manufacturing Company of Milwaukee, Wis., has secured a contract for a complete ice-making plant, to be installed in the principal ice factory at Tokyo. The plant will have a capacity of 50 tons per day of clear ice. The ammonia compression system will be used.

OSAKA AUTOMOBILE COMPANY.—This corporation, which has a capital stock of -Y-150,000, has opened a motor car service, with 6 cars each having a seating capacity for 10 passengers, between the N. end of the Nippon Bridge, in the City of Osaka, and Sakai and Ohama, with stations at Imamiya, Tobita, and Tenkachaya. A 20-min. service has been established.

AMERICAN LUMBER EXPORT TO THE ORIENT.—"With the cessation of hostilities in Manchuria," says President Wheelwright, of the Pacific Export Lumber Company, "the condition of the lumber market in all Oriental countries drawing their supplies from the Pacific Coast is bound to improve, for the reason that the enormous sum of money now expended in war armament will be released and allowed to flow into the channels of commerce."

WESTINGHOUSE ORDERS, JAPAN.—The New York office of Messrs. Takata & Co., Japan, has received contracts for vertical, single-acting, simple and compound engines, from the Akabane, Kure, Tokio and Yokoska arsenals, the Kiushiu and Nippon railways, the Fukagawa and Tokyo electric light companies, the Furukawa Western Bureau, the Tokyo Imperial University, the Yokohama Electric Wire Works and the Tokyo Waterworks, aggregating in all about 8,000 h. p. All this apparatus will be of Westinghouse construction.

FAR EASTERN STOCKS AND QUOTATIONS

COURTESY OF BENJAMIN, KELLY & POTTS, SHAREBROKERS, HONGKONG, September, 1905.

STOCKS	WHEN ESTABLISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation* PER CENT	CLOSING QUOTATIONS
Banks.												
Hongkong and Shanghai Banking Corporation	1865	$10,000,000	80,000	$125	$125	g £1,000,000 s $8,500,000 i $250,000	$1,702,728	30-6-05	£1.15/. at exchange 1/10½= $18.66.67 for first half-year 1905	21-8-05	5%	$885 ex div. (sellers London £88½
National Bank of China, Limited	1891	£699,475	99,925	£7	£5	$200,000	$41,768	31-12-04	$2 (London 3/6) for 1903	1-2-04	—	$38 buyers
Marine Insurances.												
Canton Insurance Office, Limited	1881	$2,500,000	10,000	$250	$50	$1,400,000 j $81,739	$150,494	31-12-03	$17 for 1903	22-10-04	5%	$335 sales
China Traders' Insurance Co., Ld.	1865	$2,000,000	24,000	$83.33	$25	$950,000 f $151,992 j $362,366 u $371,445	Nil.	30-4-04	$4½ for year ended 30-4-1904	8-12-04	53%	$80 buyers
North China Insurance Co., Ld.	1863	£150,000	10,000	£15	£5	Tls. 800,000	T217,119	30-6-04	Interim of 7/6 for 1905	1-5-05	8%	T82
Union Insurance Society of Canton, Limited	1867	$2,500,000	10,000	$250	$100	s $1,850,000 g £20,000 f $372,749 j $893,110 u $846,773	$2,078,997	30-6-04	$35 for 1903	21-10-04	4¾%	$750 buyers
Yangtsze Insurance Association, Ld.	1862	$800,000	8,000	$100	$60	$750,000 j $50,000 f $5,890	$599,364	31-12-04	$12 and $3 special dividend for 1903	12-4-05	8½%	$172½
Fire Insurances.												
China Fire Insurance Co., Ld.	1870	$2,000,000	20,000	$100	$20	$1,000,000 x $218,039 f $2,241	$260,374	31-12-04	$6 dividend and $1 bonus for 1903	10-3-05	8¼%	$84 sales
Hongkong Fire Insurance Co., Ld.	1868	$2,000,000	8,000	$250	$50	$1,200,505	$360,372	31-12-04	$34 for 1903	7-3-05	10½%	$335 sales
Shipping.												
China and Manila Steamship Co., Ld.	1882	$750,000	(1) 30,000	$25	$25	$5,000	$8,832	31-12-04	$1 for 1904	27-3-05	5%	$20 sellers
Douglas Steamship Co., Ld.	1883	$1,000,000	20,000	$50	$50	$185,000 i $85,439	Nil.	30-6-04	$2 for year ended 30-6-1904	29-9-04	5¾%	$35
Hongkong, Canton and Macao Steamboat Company, Ld.	1865	$1,200,000	80,000	$15	$15	e $250,000 d $600,000 f $145,376	$8,064	30-6-05	$1 for first half-year 1905	16-8-05	7¾%	$26 buyers
Indo-China Steam Navigation Company, Ld.	1882	£1,200,000	(2) 60,000	£10	£10	£120,000 i £241,150 h £3,999	£4,435	31-12-04	12/. @ 1/10 7-8=$6.29.51 for 1904	13-7-05	6½%	$96
Shanghai Tug and Lighter Co., Ld. Do. Preference.	1903	T1,500,000	200,000 100,000	T50	Tls. 50	i T25,000	T43,762	31-12-04	Final of Tls 2¼ making Tls. 4¼ for '04 Final of Tls. 1½ making Tls. 3½ for '04	1-3-05	7½% 7%	T60 buyers T50 buyers
"Shell" Transport & Trading Co., Ld.	1898	£2,000,000	2,000,000	£1	£1	£400,000 i £4,116	£58,852	31-12-03	Interim of 1/- (Coupon No. 5) for '04	1-1-05	4¾%	21/- sellers
"Star" Ferry Co., Ld.	1898 1900	$200,000	10,000 10,000	$10 $10	$10 $5	$65,000 i $24,257	$929	30-4-05	$1.80 for year ended 30-4-05 $0.90 cents for year ended 30-4-05	29-5-05	5½% 3¾%	$33 $25
Straits Steamship Co., Ld.	1890	$500,000	(3) 5,000	$100	$100	$400,000 e $21,075 i $130,153	$21,231	31-12-04	$10 for 1904	21-3-05	6¾%	$150
Taku Tug and Lighter Co., Ld.	—	T. T1,500,000	30,000	T. T50	T. T50	Tls. 98,000 d Tls. 195,479 e Tls. 28,000 i Tls. 81,200	T4,333	31-12-04	Interim of Tls. 2 for 1905	27-7-05	13¾%	T29 buyers
Refineries.												
China Sugar Refining Company, Ld.	1878	$2,000,000	20,000	$100	$100	e $450,000	$42,812	31-12-04	Interim of $10 for 1905	18-8-05	11%	$229
Luzon Sugar Refining Company, Ld.	1882	$700,000	7,000	$100	$100	none	$85,987	31-12-04	$3 for 1897	24-3-98	—	$25 sellers
Perak Sugar Cultivation Co., Ld.	—	T350,000	7,000	Tls. 50	Tls. 50	T100,000	T1,635	30-9-04	T2½ for year ending 30-9-1904	17-12-04	3¾%	T68 buyers
Mining.												
Chinese Engineering & Mining Co., Ld.	1901	£1,000,000	1,000,000	£1	£1	q £40,000	£7,820	29-2-04	Interim of 1/- (No. 4)	...-7-05	—	T7.70 sellers
Oriental Consolidated Mining Co., Ld.	1901	G. $5,000,000	y 500,000	G. $10	G. $10	none	G. $672,093	31-12-04	Interim of 50cts. (gold) for '95 (No. 5)	11-7-05	—	G. $18
Raub Australian Gold Mining Co., Ld.	1892	£200,000	150,000 50,000	£1 £1	18/10 £1	£4,873	£8,745	31-3-05	No. 12 of 1/-=48 cents	28-1-01	—	$3½ buyers

STOCKS	WHEN ESTAB-LISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation* PER CENT	CLOSING QUOTATIONS
Docks, Wharves and Godowns.												
Farnham, (S. C.) Boyd & Co., Ld.	1901	T5,520,000	55,200	T100	T100	T1,000,000	T34,924	30-4-05	Final of T8 making T13 for 1904/05	24-6-05	9¼%	T137 buyers
Fenwick (Geo.) & Company, Ld.	1889 1905	$450,000	6,000 z 12,000	$25	$25	$70,000	$8,577	31-12-04	$3¼ for 1904.. on 6,000 shares... First year	13-3-05 —	7½% —	$27 buyers $25 buyers
Hongkong and Kowloon Wharf and Godown Co., Ld.	1886	$2,000,000	40,000	$50	$50	$250,000 q $58,423 i $10,000	$29,422	31-12-04	Interim of $2½ for 1905	26-7-05	5 %	$100
Hongkong & Whampoa Dock Co., Ld.	1901	$2,500,000	50,000	$50	$50	p $300,000 i $41,500	$501,332	30-6-05	$6 for first half year '05	22-8-05	6¼%	$191 ex div.
New Amoy Dock Co., Ld.	1892	$40,500	6,000	$6¾	$6¾	$55,500	$489	31-12-03	$1¼ for '03	5-5-04	7 %	$17 sellers
Shanghai and Hongkew Wharf Co. Lt.	1902	T3,200,000	32,000	T100	T100	b T487,210 r T59,880	T10,711	31-12-04	Interim of T6 for 1905	23-8-05	6¼%	T191 ex div.
Tanjong Pagar Dock Co., Ld.	1864	$3,700,000	37,000	$100	$100	$2,100,000	$206,745	31-12-04	$20 for second ½ year making $26 for '04	20-3-05	6¾%	$390
Yangtsze Wharf and Godown Co., Ld.	1902	T250,000	2,500	T100	T100	T17,500	T2,762	31-12-05	T18 for '04	29-3-05	9¼%	T195 buyers
Lands, Hotels and Buildings.												
Astor House Hotel Co., Ld. (Shanghai)	1901	$750,000	(4) 30,000	$25	$25	$14,156	$9,028	30-6-05	$2½ for year ending 30-6-05	19-8-04	9¼%	$27½ ex div.
Astor House Hotel, Ld. (Tientsin)	—	T. T100,000	2,000	T. T50	T. T50	T34,000 e T8,000	T806	29-2-05	Final of T5 making T9 for the year.	20-4-05	6¾%	T135 sales
Central Stores, Ld.	—	$91,845	6,000	$15	$12				Final of 60 cents making $1.80 for 04.	30-3-05	10 %	$18 sales
Do. (Founders')			123	$15	$12				None	—	—	$100
Do. (New Issue)	1904	$360,000	24,000	$15	$7½	$20,000	$1,502	31-12-04	Preferential of 7% for '04	30-3-05	7 %	$7½
Hongkong Hotel Co., Ld.	1866	$600,000	12,000	$50	$50	$100,000 r $10,000	$3,554	31-12-04	$5 for 2nd half-year making $10 for '04	30-3-05	7 %	$150
Hongkong Land Investment and Agency Co., Ld.	1889	$5,000,000	50,000	$100	$100	e $250,000	$37,875	31-12-04	Interim $3½ for 1905	27-7-05	5½%	$128
Hotel des Colonies Co., Ld. (Shanghai)	1902	T225,000	9,000	T25	T25	n T20,986	T7,202	31-3-05	T2½ for the year ending 31-3-05	18-5-05	14 %	T18 buyers
Hotel Metropole Company, Limited	1904	$200,000	2,000	$100	$100	—	First	year	Interim of $4	26-1-05	...	$105
Humphreys' Estate & Finance Co., Ld.	1887	$1,500,000	150,000	$10	$10	i $200,994 e $50,000	$11,958	31-12-04	90 cents for '04	11-2-05	7¼%	$12¼ sales
Kowloon Land and Building Co., Ld.	1889	$300,000	6,000	$50	$30	none	$377	31-12-04	$3 for '04	31-1-05	7½%	$40 sellers
Shanghai Land Investment Co., Ld.	1901	T2,600,000	52,000	T50	T50	T828,813 e T170,000	T40,066	31-12-04	Interim of T3 for '05	21-7-05	6¾%	T122 sellers
Tientsin Hotel des Colonies, Ld.	1903	T70,000	1,400	T50	T50	none	T670	31-12-04	Interim of T3 for '05	4-7-05	12 %	T45 sales
Tientsin Land Investment Co., Ld.	1902	T772,600	7,726	T100	T100	i T67,300	T725	31-12-04	Interim of T3 for '05	2-8-05	6 %	T117½ buyers
Wei-hai-wei Land and Building Co., Ld.	1899	T91,850	3,764	T25	T25	none	T687	31-12-04	None	—	—	T12 buyers
West Point Building Co., Ld.	1889	$625,000	12,500	$50	$50	none	$1,247	31-12-04	Interim of $1¼ for '05	27-7-05	6¾%	$56 sellers
Cotton Mills.												
Ewo Cotton Spinning and Weaving Co., Ld.	1895	T750,000	15,000	T50	T50	none	T12,844	31-10-04	T4 for year ended 31-10-03	22-12-03	8 %	T50 sales
Hongkong Cotton Spinning, Weaving and Dyeing Co., Ld.	1901	$1,250,000	125,000	$10	$10	none	$22,862	31-7-04	50 cents for year ended 31-7-04	12-9-04	3¼%	$16
International Cotton Manufacturing Co., Ld.	1895	T750,000	(5) 10,000	T75	T75	T50,000	T13,629	30-9-04	Interim of 3% a/c 1898	30-4-98	—	T45 sales
Laou-kung-mow Cotton Spinning & Weaving Co., Ld.	1895	T800,000	(6) 8,000	T100	T100	none	T10,000	31-12-04	Interim of 4% a/c 1898 on 6,000 shares	1-8-98	—	T57½ buyers
Soy Chee Cotton Spinning Co., Ld.	1895	T1,000,000	2,000	T500	T500	l T5,658	T22,051	31-12-04	4% for 1897	2-2-98	—	T225 buyers
Miscellaneous.												
Anglo German Brewing Co., Ltd.	1905	$100,000	4,000	$100	$100	—	—	—	First year	—	—	$118
Bell's Asbestos Eastern Agency, Ld.	1895	£5,377.10s	8,604	12/6	12/6	£314	£770	31-12-04	1/3 per share for '04	21-7-05	9¼%	$7 buyers
Campbell, Moore & Co., Ld.	1886	$12,000	1,200	$10	$10	$8,000	$1,182	31-12-04	$3 for 1904	1-4-05	8¼%	$36
China-Borneo Co., Ld.	1903	$720,000	(7) 60,000	$12	$12	none	—	31-12-04	$1 for 1904	17-3-05	8½%	$11¼
China Flour Mill Co., Ld.	—	T200,000	4,000	T50	T50	T30,000	T718	31-12-04	Interim of T5 for 1904	24-7-05	8½%	T77½
China Light and Power Co., Ld.	1901	$500,000	50,000	$10	$10	none	$3,739	29-2-04	None	—	—	$10
China Provident Loan and Mortgage Co., Ld.	1898	a $1,000,000	100,000	$10	$10	$80,000	$1,5 81	31-12-04	80 cents for 1904	18-1-05	8¾%	$9.10 sales
Dairy Farm Company, Ld.	1896	$187,500	25,000	$7½	$6	—	—	31-7-04	$1¼ for year ending 31-7-03	20-11-03	—	$17 sales

STOCKS	WHEN ESTAB-LISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation* PER CENT	CLOSING QUOTATIONS
Miscellaneous.—Continued												
Green Island Cement Co., Ld.	1889	$1,500,000	150,000	$10	$10	*p* $400,000 $500,000	$95,054	31-12-04	$2 for 1904	27-2-05	7 %	$28
Hall & Holtz, Ld.	—	$420,000	(*8*) 21,000	$20	$20	$186,000	$7,551	29-2-05	Final of $1½ making $2½	15-4-05	9¼%	$27 buyers
Hongkong and China Gas Co., Ld.	1864	£70,000	7,000	£10	£10	*f* £25,394 £3,000	£8,188	31-12-04	Final of 6% & bonus of 1% making 22s. for 1904	25-5-05	7 %	$175 buyers
Hongkong Electric Co., Ld.	1889 1899	$600,000	30,000 30,000	$10 $10	$10 $5	none	$2,151	30-4-05	$1.00 50 cents } for year ending 30-4-05	17-7-05	6¾% 5¼%	$15 $9½
Hongkong High-Level Tramways Co., Ld.	1887	$125,000	1,250	$100	$100	$50,000	$2,796	30-11-04	$15 for year ending 30-11-04	24-12-04	7 %	$215 buyers
Hongkong Ice Company, Ld.	1881	$125,000	5,000	$25	$25	*k* $60,000	$5,356	31-12-04	Interim of $4 for 1905	2-8-05	7 %	$237½ sellers
H'kong Rope Manufacturing Co., Ld.	1883	$500,000	10,000	$50	$50	$60,000	$11,137	31-12-04	$10 for 1904	10-4-05	7 %	$152 buyers
Hongkong Steam Waterboat Co., Ld.	1900	$150,000	15,000	$10	$10	$2,500	$299	30-9-04	Interim of 50 cents for half year ended 31-3-1905	3-6-05	13¼%	$15
Lane, Crawford & Co., Ld. (Shanghai)	1903	$250,000	2,500	$100	$100	none	$21,582	29-2-04	Interim of $5	19-11-04	7¼%	$145 sales
Maatschappij tot Mijn-, Bosch- en Landbouwexploitatie in Langkat	1902	G.2,500,000	25,000	G.100	G.100	T528,210 T19,465	T35,849	31-10-04	2nd quarterly dividend of T5 making so far T12½ for '05	15-6-05	—	T175 sales
Mondon, (E. C.) Ld.	1902	T350,000	7,000	T50	T50	none	*Dr.* T117,638	31-12-04	T5 for 1902	2-5-03	—	T25
Philippine Company, Ld.	1904	$675,000	67,500	$10	$10	—	—	—	First year	—	—	$9½ nominal
Shanghai and Hongkong Dyeing and Cleaning Co., Ld.	1903	$60,000	1,200	$50	$50	none	*Dr.* $5,537	31-8-04	None	—	—	$50
Shanghai Gas Co., Ld.	1903	T800,000	16,000	T50	T50	*q* T145,000 T108,172	T8,011	31-12-04	Interim of T3½ for 1905	26-7-05	7 %	T122½ buyers
Shanghai Horse Bazaar Co., Ld.	1904	T270,000	5,400	T50	T50	T45,000	T10,247	31-12-03	T5 for 1903	8-4-04	6 %	T80 sales
Shanghai Pulp and Paper Co., Ld.	—	T450,000	4,500	T100	T100	T25,000	T6,968	31-12-04	Interim of T6 for 1905	22-7-05	8¾%	T155 sales
Sanghai Sumatra Tobacco Co., Ld.	1902	T600,000	(*9*) 30,000	T20	T20	T24,820 T25,000	T1,297	31-10-04	Final of T6 making T9	8-3-05	13½%	T68 sales
Shanghai Waterworks Co., Ld.	1881	£144,000	7,200	£20	£20	T170,000	T17,220	31-12-04	Interim of 15/. for 1905	27-7-05	4½%	T42c buyers
South China Morning Post, Ld.	1903	$150,000	6,000	$25	$25	none	*Dr.* $5,068	29-2-05	None	—	—	$20
Steam Laundry Co., Ld.	1902	$75,000	15,000	$5	$5	none	$3,644	31-5-04	60 cents for year ended 31-5-04	2-8-04	7¾%	$8
Straits Ice Company, Ld.	1884	$200,000	2,000	$100	$100	$25,000	$700	31-12-04	$5 account 1905	...-2-05	—	$150
Tientsin Waterworks Co., Ld.	1901	T. T200,000	2,000	T. T100	T100	*e* T15,259 T4,000	T1,012	30-4-05	Final of T4½ making T8½ for '04/5	17-6-05	7 %	T. T120
United Asbestos Oriental Agency, Ld. Do. do. (Founders')	1896	$100,000	9,900 100	$10 $10	$4 $10	$22,000	$551	31-5-05	80 cents $19.80 } for year ended 31-5-'05	29-7-05	9 % 11 %	$9 buyers $180 buyers
Watson (A. S.) & Co., Ld.	1886	$900,000	90,000	$10	$10	$300,000 $25,000	$6,096	31-12-04	Final of 50 cents making $1 for '04	29-5-05	7½%	$14 buyers
William Powell, Ld.	1901 1905	$120,000 $30,000	12,000 3,000	$10	$10	*e* $3,000	$588	30-6-04	Interim of 50 cents for year '04/5 First year	10-4-05 —	10½% —	$11¼ buyers $10½ sales

LOANS AND DEBENTURES	AGENTS FOR THE LOAN	AMOUNT OF LOAN	PAR VALUE	OUT-STAND'G BONDS	WHEN PAYABLE.	CLOSING QUOTATIONS
China Government, 7 per cent. Silver Loan 1886 E.	Hongkong & Shanghai Bkg. Cor.	T767,200	T250	1969	Mar. 31st & Sept. 30th each year until Mar. 31st, 1917.	par. } Plus accrued interest
Hongkong Hotel Co., Ltd., 6% Mortgage Debentures of 1899‡	Hongkong & Shanghai Bkg. Cor.	$500,000	$500	§ all	Half yearly, June 30th and December 31st	par.
Shanghai & Hongkew Wharf Company Ltd. 6% Debentures of 1902	Hongkong & Shanghai Bkg. Cor.	T543,900	T100		Half yearly, June 30th and December 31st	T97
Astor House Hotel Co. Ltd. 8% Debentures of 1903	Hongkong & Shanghai Bkg. Cor.	T500,000	T100		Half yearly, January 1st and July 1st	T105
Chinese Engineering & Mining Co., Ltd., 6% Debentures of 1903†		£500,000	¶	£480,000	Half yearly, June 30th and December 31st	par.
International Cotton Manufacturing Co. Ltd. 6% Debentures of 1901	Russo Chin. B.	T500,000	T100		Half yearly, March 31st and September 30th	par.

a Authorized capital $2,000,000
b Building Reserve Account.
c Capital Reserve Fund.
d Depreciation and Insurance Fund.
e Equalization of Dividend Fund.
f Exchange and Investment Fluctuation Account.
g Gold Reserve Fund
h Exchange Reserve Account.
i Insurance Fund.
j Reinsurance Fund.
k Contingencies Account

l Legal Reserve Fund.
m
n Sinking Fund.
o
p Premium on New Issue.
q Depreciation and Repair Fund.
r Repairs and Renewals Account.
s Silver Reserve Fund.
t
u Underwriting Suspense Account.
v Special Works Fund.

w
x Extra Reserve Fund.
y 75,000 owned by the Company.
z 6,000 shares unissued.
1 5,725 shares unissued.
2 First issue of 60,000 of which 10,411 unallotted.
3 785 shares unissued.
4 7,600 shares unissued.
5 1,616 shares unallotted.
6 842 shares unallotted.
7 14,000 shares unissued

8 399 shares unissued.
9 Only 13,000 shares issued.
* Based on last year's dividend.

§ 270 held by the Company.
¶ In certificates of £20 and £100
‡ Redeemable in 10 years, or at option of Company the Company giving 6 months' notice.
† Redeemable at par at rate of £10,000 per annu from 31st December, 1903 to 31st December, 195 2
Dr. Deficit.

SINGAPORE SHARE QUOTATIONS.

Courtesy Messrs. Fraser & Co. Brokers, Singapore, September, 1905.

NAME	DATE OF FORMATION	CAPITAL	CAPITAL PAID UP	NO. OF SHARES	ISSUE VALUE	PAID UP	RESERVE	LAST DIVIDEND	SINCE LAST MAIL HIGHEST	SINCE LAST MAIL LOWEST	CLOSING QUOTATIONS
Mining.									$	$	$
Bersawah Gold Mining Co., Ld.	1900	$175,000	115,000	13,500 [1]	10	7.50	....	....	....	....	14.00 sellers
" " " " *Deferred*				4,000	10	10	....	....	....	....	8.00 sellers
Bruseh Hydraulic Tin Mining Co., Ld.	1901	$600,000	600,000	60,000	10	10	....	....	5.75	5.50	5.75 buyers
Kadana Gold Mining Co., Ld.	1901	$300,000	300,000	20,000	10	10	....	....	....	....	10.00 nominal
" " " " *Pref.*				10,000	10	10	....	....	....	....	10.00 "
Kechau Goldfields, Ld. *Fully paid*	1902	£30,000	16,175-7/-	6,207	1	1	....	....	....	....	8.00 sellers
" " " *Contrib.*				23,793 [2]	1	19/-	....	....	....	....	7.50 sellers
Pahang Corporation Ld.	1889	£250,000	244,306	244,306	1	1	20,000	3 per cent for year ending 30-6-02	....	....	3.50 sellers
Pahang Kabang Ld.	1890	£375,000	375,000	360,000	1	1	....	....	0.70	0.60	0.70 buyers
" " " *Pref.*				15,000	1	1	....	....	....	....	...... nom.
Queensland Raub G. M. Co., Ld. *Fully paid*	1901	£146,700	100,866	36,700	1	1	....	....	....	....	...... nom.
" " " " " *Contrib.*				110,000	1	11/8	....	....	....	....	0.30 sellers
Raub Aust. Gold Ming. Co., Ld. *Fully paid*	1892	£200,000	191,250	50,000	1	1	4,873	1s. paid January, '01	....	....	5.00 nom.
" " " " " *Contrib.*				150,000	1	18/10	....	1s. " " "	....	....	4.75 sellers
Redjang Lebong Mining Co.	1898	f.2,000,000	1,800,000	20,000 [3]	100	100	....	22 9-10% for year ending 31-12-04	....	....	300.00 sellers
Royal Johore Tin Mining Co., Ld.	1900	$220,000	220,000	22,000	10	10	....	5 " for year ending 15-2-04	3.25	2.75	3.25 sellers
Sipiau Tin Co., Ld.	1899	$230,000	230,000	23,000	10	10	....	5 " for ½ year ending 30-6-03	5.25	5.00	5.25 buyers
The Belat Tin Mining Co., Ld.	1903	$300,000	300,000	30,000	10	10	....	....	....	....	6.00 sellers
Tronoh Mines, Ld.	1902	£160,000	149,185	160,000 [5]	1	1	....	5/6 paid during 1905	....	....	22.00 sales
Duff Development Co., Ld.	1903	£400,000	350,000	400,000 [6]	1	1	....	....	....	....	8.00 sellers
Rubber.											
Bukit Rajah Rubber Co.	1903	£70,000	61,000	70,000 [13]	1	....	....	....	....	....	£2.15s.0d. sellers
Balgownie Rubber Estate Ltd.	1905	$200,000	100,000	20,000	10	5	....	....	....	....	$6.50 sellers
Cicely Rubber Estates Co.	1904	£12,000	10,500	6,000	1	....	....	....	....	....	£1.13s. 6d. sellers
" " " 5% Pref.				6,000 [14]	1	....	....	....	....	....	£1.15s. 0d. sellers
Pataling Rubber Estate Syndicate	1903	£30,000	17,500	30,000 [15]	1	1	....	....	....	....	£2.15s. 0d. ......
Ribu Planting Co. Ld.	1904	$200,000	135,000	2,000 [16]	100	100	....	....	....	....	$200.00 sellers
Sandycroft Rubber Co.	1904	$100,000	85,000	1,000 [17]	100	100	....	....	....	....	$130.00 buyers
Selangor Rubber Co. Ltd.	1898	£30,000	26,000	30,000 [18]	1	1	....	....	....	....	£5.10s. 0d. sellers
Singapore & Johore Rubber Co. Ld.	1903	$100,000	78,750	150	100	100	....	....	....	....	$100.00 ......
" " " " " " *Contrib.*				850	100	75	....	....	....	....	75.00 ......
Sungei Way Rubber Co. *Fully paid*	1904	£50,000	13,920	6,920	1	1	....	....	....	....	£2 0s. 0d. nom.
" " " " *Contrib.*				35,000 [19]	1	4/-	....	....	....	....	18s. 0d. sales
Vallambrosa Rubber Co.	1904	£60,000	50,000	60,000	1	....	....	....	....	....	£2.17s 6d ......
General.											
Fraser & Neave, Ld.	1898	$225,000	225,000	4,500	50	50	112,500	10 p. ct. and 2½ per cent bonus for '04	....	....	101.00 sellers
Hogan & Co., Ld.	1904	$480,200	334,800	3,348	100	100	5,000	7 per cent March 1905	75.00	70.00	70.00 sales
H'kong and Shanghai Banking Corporation	1865	£10,000,000	10,000,000	80,000	125	125	10,000,000 [9] 6,500,000 250,000 [10]	30s. div. and 10s. bonus at 1/11 9/16 =$25.46.42 per share for ½ year ending 31-12-04	....	....	825.00 ......
Howarth Erskine, Ld.	1901	$1,200,000	1,200,000	12,000	100	100	275,000	10 & 5 p. ct. bon. for yr. end. 30-6-05	....	....	255.00 nom.
Maynard & Co., Ld.	1901	$34,000	34,000	3,400	10	10	....	20 per cent for year ending 31-10-04	....	....	23.00 sellers
Riley, Hargreaves & Co., Ld.	1899	$875,000	875,000	6,000	100	100	150,000	10 p. ct. and 2½ p. ct. bon. for year '04	250.00	240.00	240.00 sales
" " " 7% Pref.				2,750	100	100	....	7 p. ct. for year 1904	....	....	115.00 buyers
Singapore Cold Storage Co., Ltd.	1903	$600,000	240,000	24,000 [4]	10	10	....	....	....	....	8.00 sales
Singapore Dispensary Ld.	1891	$30,000	30,000	600	50	50	19,000	12½ per cent for year ending 31-7-04	....	....	77.50 buyers
Straits Ice Co., Ld.	1884	$200,000	200,000	2,000	100	100	22,000	5 " interim for 1905	....	....	150.00 buyers
Straits Steam Ship Co., Ld.	1890	$500,000	421,500	5,000 [7]	100	100	400,000 169,228 [11]	5 p. ct. interim for 1905	147.50	145.00	145.00 sales
Straits Trading Co., Ld.	1887	$3,000,000	2,500,000	300,000 [8]	10	10	700,000 1,021,395 [12]	10 p. ct. & 50cts. bon. ½ yr. end 31-3-05	42.50	42.25	42.50 sales
Tanjong Pagar Dock Co., Ld.	1864	$3,700,000	3,700,000	37,000	100	100	1,950,000	$20 for half year ending 31-12-04	....	....	385.00 buyers
Debentures. $											
Howarth Erskine Ld. 7 per cent ... 250,000	....	....	....	....	....	....	....	....	....	....	3 per cent prem.
Singapore Municipal 6 " ... 400,000	....	....	....	....	....	....	....	....	....	....	... " nominal
" " 5 " ...1,878,000	....	....	....	....	....	....	....	....	....	....	2 " prem. buyers
" " 4 " ... 602,300	....	....	....	....	....	....	....	....	....	....	2 " dis. nominal
Riley, Hargreaves & Co., Ld. 6 p. cent 225,000	....	....	....	....	....	....	....	....	....	....	3 " prem. buyers
Tanjong Pagar Dock Co., Ld. 6 " 250,000	....	....	....	....	....	....	....	....	....	....	2 " prem. sales
" " " " 5 " 1,365,500	....	....	....	....	....	....	....	....	....	....	1 " prem.

1 3,500 unissued.
2 13,300 "
3 2,000 "
4 36,000 unissued.
5 10,815 "
6 50,000 "
7 785 unissued.
8 50,000 "
9 Special Gold Reserve Fund.
10 Insurance Fund.
11 Sundry Reserves.
12 Sundry Reserves.
13 9,000 unissued.
14 1,500 "
15 12,500 " Mortgage £5,000
16 650 unissued.
17 150 "
18 4,000 "
19 8,080 "

FRASER & CO., Sharebrokers

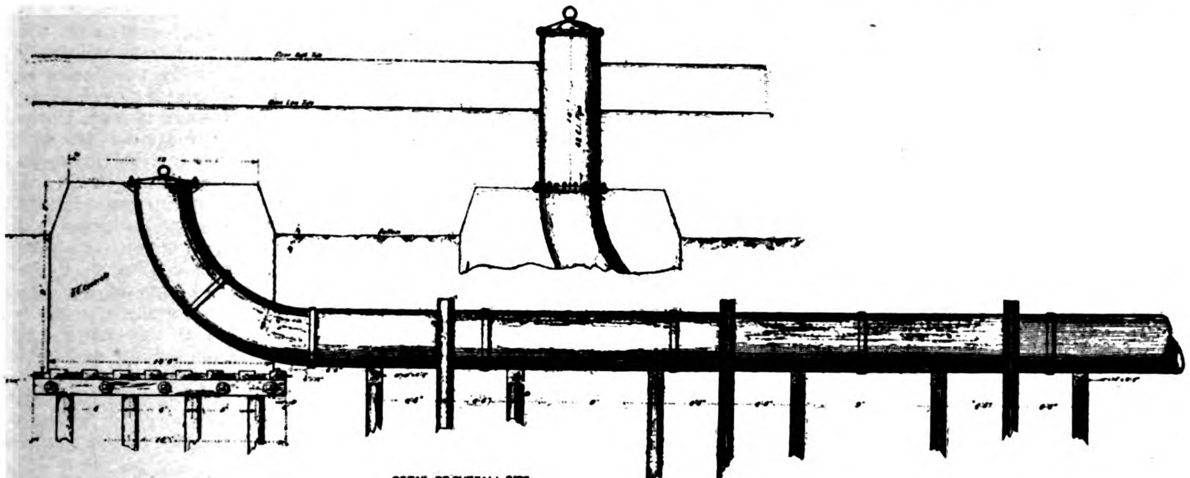
FAR EASTERN REVIEW

COMMERCE ❂ ENGINEERING ❂ FINANCE

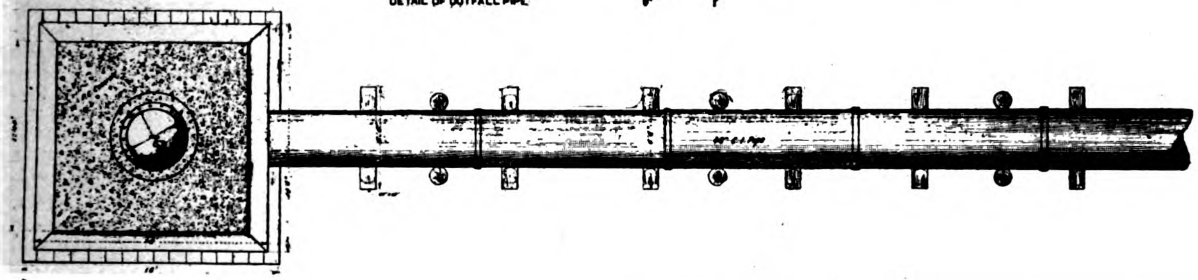
VOL. II. MANILA, P. I., AND SHANGHAI, OCTOBER, 1905. No. 5.

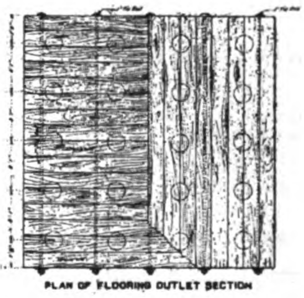
RECONSTRUCTION OF MANILA'S SEWER SYSTEM ALONG MODERN LINES

(J. F. CASE, C. E., CHIEF ENGINEER.)

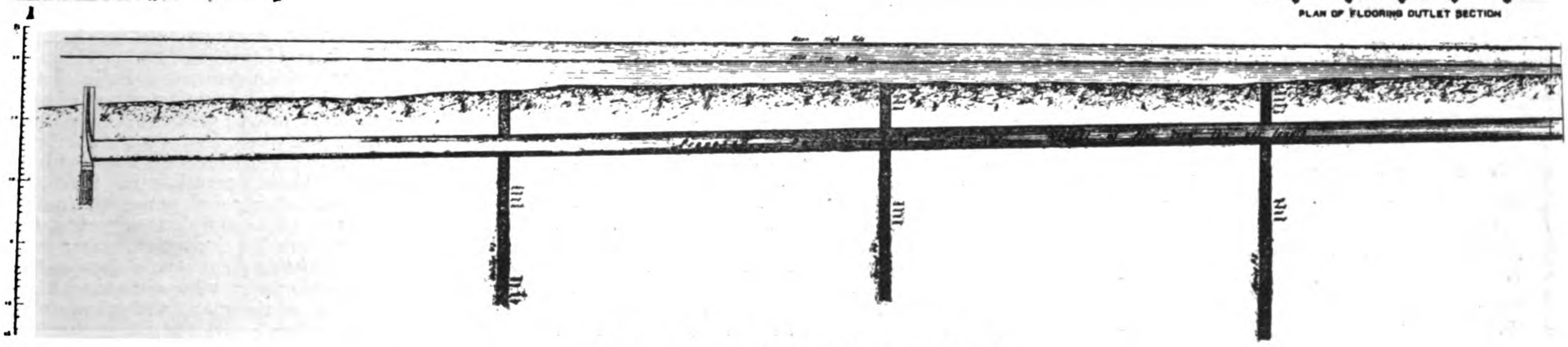


DETAIL OF OUTFALL PIPE





PLAN OF FLOORING OUTLET SECTION



OUTFALL PIPE LEADING INTO MANILA BAY.

On another page of THE FAR EASTERN REVIEW there appears an invitation for bids or proposals for the construction of a system of sewers and appurtenances for the City of Manila, which will be under the direction of Mr. J. F. Case, C. E., chief engineer, Department of Sewer and Waterworks Construction. Specifications, general plans, and blank forms for proposals may be obtained at the office of the Municipal Board of Manila. Plans and specifications may also be seen at the office of the Bureau of Insular Affairs, War Department, Washington, D. C.

The approximate length of the main sewers is as follows:

	Lineal feet
4.75-foot diameter sewer	1,590
4.50-foot diameter sewer	2,220
4.25-foot diameter sewer	3,300
4-foot diameter sewer	3,150
3.75-foot diameter sewer	6,100
3.25-foot diameter sewer	4,220
2.75 x 4.12-foot diameter sewer	720
2.50 x 3.75-foot diameter sewer	3,370
2.25 x 3.37-foot diameter sewer	6.430
2 x 3-foot diameter sewer	8,040

All bids will be compared on the basis of the engineer's estimate of qualities of work to be done, which, subject to change, is as follows:

Item 1.	156 lineal feet 16-inch straight cast-iron bell and spigot pipe, 4 specials, and 1 (one-fourth) bend. tons of 2,000 pounds	11
2.	310 lineal feet 18-inch straight cast-iron bell and spigot pipe, 8 specials, 3 (one-fourth) bends...tons of 2,000 pounds..	27
3.	70 lineal feet of 24-inch straight cast-iron bell and spigot pipe, 3 (one-fourth) bends...tons of 2,000 pounds..	9
4.	1,120 lineal feet 24-inch straight flexible-joint cast-iron pipe and 16 specials (188 feet).... ..tons of 2,000 pounds..	219
5.	136 lineal feet 30-inch straight cast-iron bell and spigot pipe, tons of 2,000 pounds..................................	22
6.	576 lineal feet 36-inch straight cast-iron bell and spigot pipe, tons of 2,000 pounds....................	131
7.	6,500 lineal feet 42-inch straight cast-iron bell and spigot pipe, including cap and 3 specials...tons of 2,000 pounds..	1,924
8.	Concrete masonry at outlet to force main ....cubic yards..	48
9.	Piling for outlet section....lineal feet..	61,000
10.	Lumber for caps and flooring for outlet section.... ....feet B. M..	40,000
11.	42-inch cast-iron pipe and specials in outlet section.... ...lineal feet..	6,500

(Continued on page 115.)

FAR EASTERN REVIEW

COMMERCE :-: ENGINEERING :-: FINANCE

A MONTHLY REVIEW OF FAR EASTERN TRADE, FINANCE, AND ENGINEERING. DEDICATED TO THE INDUSTRIAL DEVELOPMENT AND ADVANCEMENT OF TRADE IN THE PHILIPPINES AND FAR EASTERN COUNTRIES.

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MANILA AND SHANGHAI, OCTOBER, 1905

PUBLISHER'S ANNOUNCEMENT

The publisher of THE FAR EASTERN REVIEW begs to announce to patrons of the paper that our China office at No. 9, Kiukiang Road, Shanghai, is now in charge of Mr. E. Collinwood, who is authorized to transact business in the name of the undersigned.

**GEO. BRONSON REA,
Publisher.**

ENGINEERING DEVELOPMENT OF THE EAST

One of the surest signs of the industrial and manufacturing development of a country is the presence in the larger cities of engineering firms and supply houses. The engineer is the pioneer in opening up a country, and his absence from any one locality marks it as a place of little life and activity as judged from European standpoints. It is true that the larger centers of China present great activity along native commercial lines, and the making of articles which can be turned out by hand; but the absence of any large chimneys representing industry according to Western ideas, give them a peculiar sleepy look, creating a discouraging first impression. Conditions, however, have gradually changed, and although still far from the desired stage, they are much better than in former years.

The Chinese mind is still slowly but surely awakening to the advantages of machinery, and in the larger centers where they are brought in constant contact with manufacturing establishments, have overcome their natural aversion to innovations. As a result, in the last few years many new industrial plants of different kinds have been purchased and installed. The building of the railroads throughout the interior, opening up hitherto unknown cities, will prove beneficial in still further interesting others, while the gradual growth of the electric light and power plants in the large treaty ports can not but help to pave the way for smaller plants inland.

The electrical development of the country has been slow, but substantial results are being secured. The example of the Hongkong tramways and the American electric street railway in Seoul has been of great benefit in overcoming the prejudice of the natives—the "devils" behind the scenes—and with the completion of the tramways in Shanghai and Tientsin, two more strong object lessons will help to spread interest in this direction. To the seventeen electric tramway companies operating in Japan, mention of whose holdings was made in the last issue of *The Far Eastern Review*, must be added the lines in Seoul, Tientsin, Chefoo (projected), Tsingtao (projected), Shanghai, Hongkong, Manila, Bangkok, Hanoi, Singapore, Penang, Rangoon, and Mandalay. A concession has been applied for by an American company for an electric tramway connecting the port with the city of Nanking, and there is every prospect o considerable development along similar lines in other parts of the Chinese Empire. In the Philippines, the system at Manila, just completed by Messrs. J. G. White & Co., will be extended to all points within reasonable distance, and other cities, such as Cebu and Iloilo, are already considering the advisability of building short lines. The railroad from Dagupan to Baguio, the summer capital of the Philippines, which is part of the general scheme advertised by the government, will in all probability use electricity for the motive power, the Agno River falls nearby, being capable of developing the energy.

The lighting field is also gradually extending, and in the last year has been completed a plant for lighting the imperial palace at Peking—remarkable as denoting the change in the attitude of the dowager-empress, who has been the main obstacle in checking any foreign innovation—and two companies have been organized, one for lighting the Tartar City, the other for the Chinese City. The former is an European company, of which Messrs. Arnhold, Karberg & Co. are the agents, and hold the contract for the plant. The other is a Chinese company, and while arrangements have been made for the plant we understand the contract is still unsigned. In Tientsin, the different concessions have their own electric light plants, the China agency of the Siemens-Schuckertwerke recently securing the contract for the German Concession plant, which will be completed during the year. There is talk of electric lighting plants for Chefoo, Amoy, Hankow, Swatow and other points, which will take definite shape in a short time. The German firms—the Allgemeine Electricitats Gesellschaft and Siemens-Schuckertwerke—seem to have made the most progress in this field as they are both represented on the ground by firms having an electrical department. The agents of the former manufacturers, Messrs. Arnhold, Karberg & Co., have secured several important contracts, among which is the application of electric motors to the mint and government factories at Wuchang.

British electrical manufacturers are represented in China by Messrs. Jardine, Matheson & Co., who hold the agency for Ernest Scott & Mountain, Ltd., and the General Electric, Ltd., by Messrs. E. C. Wilks & Co., of Hongkong. Messrs. Sam. H. Shorrock, electrical engineers of Shanghai, recently secured the contract for the Shanghai tramways for Bruce, Peebles & Co., the electrical machinery manufacturers of Edinburgh and London. The Shanghai Electric and Asbestos Company and Messrs. F. E. Potter & Co., of Shanghai, also carry on a general electrical business for Shanghai and the outposts, and all the larger shipbuilding and dock companies throughout the East conduct an electrical department for marine work.

Outside of Manila, American electrical firms do not seem to be represented in China, although they are strong in Japan. In the latter country, however, many of the orders are placed through Japanese firms with New York branches. Another factor in the Chinese electrical field which will have to be counted on in future—especially for small isolated plants and central stations—is the Japanese manufacturer. The Shibaura Engineering Works of Tokyo manufacture a high-class generator and motor in addition to other electrical apparatus, and the "Miyabara" water-tube boiler, and are in good condition, through their connections, to make a strong fight for small plants. This company is one of the Mitsui enterprises and has the well-organized machinery of the selling company, the mitsui Bussan Kaisha, to push its machinery when the time is ripe. Already the Japanese have secured several minor contracts in China for under the noses of over-confident European firms, and with the termination of the war and return to normal conditions, we may expect increased activity from this source. A new field will be open for the enterprise of the Japanese engineer, educated in European and American technical colleges, who, with the advantage over the foreigner in dealing with the Chinese, and selling the machinery of his own country, will prove a most formidable competitor. Japan has easily led the European countries in electrical development and has many competent and experienced men as a result of established electrical industries, and several such engineers are already located throughout China, catering solely to the native trade.

In Manila the larger American electrical manufacturers are fairly well represented—the General Electric Company by Grant & Co., Ltd., the Westinghouse Electric Manufacturing Company by Messrs. Castle Bros.-Wolf & Sons, the Allis-Chalmers-Bullock Company by the Bryan-Landon Company, and the C. and C. Electric Company by Fred W. Bohler, while the Manila Electric Railroad and Light Company also handles motors and supplies for its patrons. Messrs. J. G. White & Co. and the Oriental Construction Company are in the field for large contracts, and Messrs. Germann & Co., Ltd., representing Siemens-Schuckertwerke, conduct an electrical department to their engineering branch and secure a good share of the business.

The field is one which demands a little closer attention from the large manufacturers, as the last few years have proved that the awakening has been rapid, and where five years ago there was only talk, today there are about thirty electric railways alone operating in the Far East, and central lighting and power plants in all the leading ports, supplying currents for thousands of motors for industrial purposes. The importance of this great stride forward is lost to the manufacturer who contents himself with glancing at the map, and comparing the few ports mentioned with the great number of cities unheard of in the onward march, but when it is considered that the China field is limited only to a few treaty ports, from which all this development emanates ,and that the same advance can be expected from the newer ports opened to trade and from there on to the ultimate opening of all the principal cities, the possibilities are such that preparation should immediately be made to meet the growing trade.

WIND.

Wind is a good force for certain ends. It can be used at times with profit. It is useful for running a sail-boat or a windmill, but you

can't run a government on wind. That takes money, and barrels of it. Money for running a government must perforce be raised by taxation, and the ability of a country to withstand taxation is in direct proportion to its productive power and the development of its natural resources. Therefore, it should be clearly apparent that to run a successful government every energy should be devoted to building up the industries of the country, in the full confidence that once material prosperity is attained there will be sufficient funds to run the government properly and a goodly balance in the treasury to devote to the dissemination of learning and the betterment of public morals.

These rudimentary principles occur to us in looking over the last Philippine Budget. Millions are there for gold lace and the school book manufacturers, but comparatively little for the real material advancement of the country. And the cry is still for more money, but the Islands have reached the limit, and but little more can be expected. The reaction has set in. The first steps are a reduction of expenses to meet the threatened deficit. This has already been acted upon by the Philippine Commission, and what has been dubbed a "headhunting" committee is now at work seeing where the pruning knife can best be employed.

We have watched with interest the various opinions advanced advocating the cutting down of a clerk or so in some one department, the abolishment of this or that bureau, or its incorporation into another, and so on, but we believe all these efforts are abortive and will only result in the saving of a few pesos at least.

It is not the pruning knife we need in the Philippines just now, but rather a large, heavy axe—the kind that lops off a branch with one good, well-directed blow. And without going into the small details of pruning, in our humble opinion this large, sharp instrument should drop right on the two bureaus which absorb the largest share of the insular appropriation—the Constabulary and the Bureau of Public Instruction. Both of them are unwieldly and take up too much of our strength to support. And both are unnecessary under their present system of organization, and out of place in the make-up of our governmental system.

The Constabulary may have proved its value, but with something like 17,000 United States troops in the Islands putting in time, doing nothing, its value is not commensurate with the extra burden on the taxpayers. We have the regular troops of the homeland and the Philippine Scouts, scattered throughout the Islands very thoroughly, to insure protection, but to satisfy the new civil government which desired to operate independent of the military, the creation of this insular constabulary was deemed necessary.

Government troops have always been garrisoned throughout the West of the home country to check any Indian outbreak and put down other disorders, and they are there today despite the existence of the state militia in the same districts. In the event of an uprising, it is the regular who goes on the war-path, and not the militia. The same should apply to the Philippines. Let us have our local police, if necessary, or a small body of rural guards to operate throughout the provinces, and when the situation demands the regulars are here to restore order. The regulars command respect among the natives; the constabularymen do not.

Inducements are held out to college graduates to seek commissions in this insular police force, and they look forward to promotion through the various grades to the star of the Brigadier-general. Vain and idle dream! All grades above that of captain will always be given to some officer of the regular army who has the necessary "pull." Then, if we are to employ army officers and give them increased pay, quarters, etc., to run our police force, why not turn the entire work over to the army and be done with it. The regulars will always have to come to the rescue anyhow. Witness Samar and the Province of Cavite.

We don't need an insular police force with brigadier-generals, colonels, lieutenant-colonels, majors, and the rest of the gold-bedecked commanders, for a while yet. We can't afford it. They are luxuries, and as such can be dispensed with until we have some money to throw away on luxuries. It is not going to undermine the prestige of the civil government to advocate this change. It is not an indication of weakness, nor inability to cope with the situation. On the contrary, the active presence of the regulars throughout the provinces will do more to restore confidence in the government and respect for its authority than all the constabulary armies it could enlist. In our opinion the constabular system is a failure, and an unnecessary luxury and expense. Work the large, sharp, heavy axe and lop it off. Don't prune it down. Just ask congress to do this at the forthcoming session and then give us the same protective functions in the Islands as prevail in the western part of the United States.

Our mission in the Philippines, according to some, is one of education, and utterly ignoring the fact that the Catholic Church has some of the finest schools in the world here, the advocates of this system have gone raving mad in education. If we listen to the arguments of the educational bureau and its supporters, they will prove to us that the entire salvation of the Islands—commercial, industrial, financial, moral, and educational—depends exclusively upon the work of this bureau; and consequently all the loose millions, odd pesos, half-pesos, pesetas and media-pesetas, should be placed in its hands for the erection of new school houses, more teachers, and especially for more school books. Yes, and they must have manual training schools, trade schools, nautical schools, high schools, grammar schools, common schools, nipa schools, model schools, and open-air schools. And now they must have a university and even a conservatory of music, which mean preparatory schools; military academies, schools of medicine, engineering and law—and don't shy any bricks this way when we add to this long list of institutions of learning, a Chautauqua! Yes, a Chautauqua after the American system is what the pedagogues are plugging for now. They want the government to establish it, probably at Baguio, supply the lecturers once a year from among the best talent in the homeland, and fix it up so that the teachers all over the Islands may assemble and drink in the words of wisdom and learning that will fall from the lips of the college professors, etc., from the homeland. This is the limit, we think.

But with all this educational insanity, the educational bureau has not been able to find means to provide a suitable school somewhere in Manila for the American children, whose parents help pay the taxes. The children can have all the school books they want. We know of a little boy 6 years of age, who was given four different readers in the space of two months, all from different publishing houses, and which called food "chow chow".

"Does Ramon like chow chow?"

"Yes, Ramon likes chow chow."

And when we asked one of the educators why the bureau did not provide a suitable school for the American children, he glibly informed us that the government was not expected nor required to look after the education of the whites.

"We're here to teach the Filipinos, not the whites."

We felt like soaking that teacher one behind the ear,—but we refrained because we saw visions of a funeral and its consequences.

So you can see that the school system has been organized and is being run for the exclusive benefit of the Filipinos. American children have no place in it.

Now, we believe in education. But we also believe that education should be meted out to people according to their ability to absorb it properly, and not given to them like the "water-cure"—forced down their throats till they choke. Education should also be given according to local willingness to pay for it. We see no good reason why this grand, generous scheme for the salvation of the Islands should be shouldered on the general taxpayer. We, in Manila, especially the Americans, pay proportionately more taxes on the necessities and luxuries of life, which go to swell the budget for the erection of a trade school in Igorotland, but we can't have a decent school for our own children.

Let the municipalities pay for their local police and local schools, under a central board, and lift this crushing blow from general taxation. This may hamper and curtail the work of the educational bureau, but we are confident it is going ahead fast enough. When it seriously advocates the creation of a university, and so saddle us with another odd million or so of debt, not to speak of the conservatory of music and that Chautauqua, we think a check should be put on its energies until such time as we have taught these people how to work.

Work, industry, and prosperity are needed—capital to develop the lands—labor to work them. And afterwards, when good times come around, and money is easy, and the material development of the country assured, let them go ahead with their universities, conservatories of music, Chautauquas, dancing schools, band-stands, gold lace, insular armies, and so on. For the present we are trying to carry these along on wind. It takes money, and we "hain't got it to spare." Let congress work the big axe and lop off this extravagant educational system, too.

CURRENCY MENACE IN CHINA.

The past year has witnessed a marked activity and upward trend of prices in the world's copper market, owing to a sudden and for a time unaccountable demand for the metal from China. This has since been fully explained by the abnormal increase of the provincial minting plants, and it is clear, even to the casual observer, that if this activity is permitted to extend without some attempt at regulation the demand will steadily increase in proportion and have a still further effect on prices.

If China can create such a stir by simply trebling her 1903 imports of 6,066 tons, the influence on the market can be imagined if existing conditions reach their logical climax with the new minting plants working to full capacity, when the demand will jump from last (1904) year's record of 13,718 tons—purchased for the mints—to a possible 108,700 tons. At the present average cost of say $350 gold per ton, this would make a total of $38,045,000 or approximately one-sixth of the entire import trade of the Empire.

Only a short time ago China pledged herself by solemn treaties to establish a uniform system of coinage, but with characteristic duplicity, hardly had the ink dried on the documents when the provincial mints were increased, and the situation at present is worse than before. The vigorous protests of the foreign chambers of commerce, commercial bodies, and the warnings of the press, have been passed over unheeded, and apparently no efforts have been made by the Diplomatic Corps at Peking to exact compliance with the terms of the treaties. If permitted to continue the situation must ultimately lead to disaster.

The unusual interest and activity in this line throws a bright light on the anti-foreign policy of the real rulers of China, for while the viceroys stoically refuse to recognize the advantage of modern machinery and appliances for the industrial development of their respective preserves, placing obstacles in the path of the foreigner seeking concessions, their antagonism disappears when it comes to a question concerning their own pockets, and this concerns them all the time. Making money—for the viceroy—is their principal pursuit, and all other interests of state and politics are subservient to this end; so the installation of "money-making" machines is now the fashion in all the provinces.

The old mints with 235 coining machines have been remodelled, and complete new plants installed. With existing plants in operation, machinery in transit and ordered for future delivery, there will be a total of 846 coining machines in operation throughout the empire, and nearly all turning out the copper 10-*cash* token. According to data on file at the Shanghai General Chamber of Commerce, the distribution of these machines is as follows:—

MACHINES

Mints.	Old.	New.	Total.
Canton	50	30	80
Foochow	20	12	32
Soochow	18	56	74

Hangchow....	16	80	96	
Nanking......	32	—	32	
Hupeh........	—	—	150	
Hunan........	4	36	40	
Ngankin......	8	12	20	
Chingkiang...	—	—	60	
Honan........	—	—	6	
Chihli....	—	100	100	
Szechuen......	82	—	82	
Shanghai......	—	45	45	Transferred to Nanking.
Kiangse.......	6	12	17	
Shantung......	—	—	12	
TOTAL......	235	383	846	

It is estimated that one machine will coin 10.71 tons of metal per month, or a total for all machines of 108,700 tons per year. One ton of copper will coin into about 151,000 10-*cash* pieces, so the total output would be about 16,413,700,000 pieces, or about forty pieces *per capita* of the estimated population of 400,000,000.

From facts secured through reliable sources it is ascertained that the metal value of one 99 per cent copper 10-*cash* piece only equals four to four and one-half 1-*cash* pieces coined in the last quarter-century, so the immediate profits to the mints is enormous. The profit is estimated at 35 to 40 per cent, of which one-third goes to the mint authorities and two-thirds to the pockets of Their Excellencies, the Viceroys, who, in turn, disgorge into the insatiable maw of those higher up at Peking.

With a real value of 6-*cash* or less the industry must be an agreeable one for the promoters, and one they will be loath to discontinue. The temptation to debase the coin in order to multiply the profits is always present when no national supervision or regulation is in force; and again, unrestricted coinage, with its consequent immense consumption of copper, must materially affect the price of the metal and increased cost is sure to compel their debasement in order to uphold the standard of profit.

These coins will be offered in payment of taxes and revenues, and will increase, resulting in new methods of taxation for the native and further impositions on foreign trade.

These mints should be under the direction of the Imperial Department, and guarded as carefully as the customs and posts. Now is the time to insist on this measure, while the scheme is new, and not yet in full working order, and not wait till the actual danger is at hand. China should uphold her treaty obligations, and by taking over the provincial mints at once can make a long stride towards gaining the respect of the Powers and setting her finances in order to meet her growing expenses.

"THE METROPOLIS OF THE EAST."

We have read with great pleasure the efforts of our esteemed contemporaries in Manila to boom the port, and have inwardly applauded the journalistic acrobatic performances in calling attention to the wonderful future for the "Isles of the Southern Sea." We have followed with interest the urdite and grave prophecies of prospective magnificence, have mentally noted for our own use the new and wonderful adjectives discovered in Webster's by the editorial explorers of the Pasig, and have nearly thrown a spasm or two, just to keep them company. But we were called away to Hongkong, to Swatow, Amoy, Foochow, finally anchoring at Shanghai, and we have had time to study the other side of the roseate forecasts, picking out flaws and discrepancies, and to peruse the glowing descriptions which arrived at our desk at long intervals. And, figuratively speaking, we have been forcibly struck with the other side of the hammer right where it hurt most, and have expended all the sulphurous words in our vocabulary every time the blow landed.

Yes, we will admit from the arguments forced upon us, that Manila is destined to be a great port—an immense distributing center; in fact, the trade Hub of the Orient which the merchants of the other picayune and insignificant ports like Hongkong, Shanghai and Singapore will turn to for cargoes and American manufactured products. We can also dream with our confreres and see visions of the Trans-pacific steamers making a bee-line from San Francisco to the Pasig, passing under the huge cranes at the great docks, and with a few turns of the crank having the entire cargo yanked out and deposited gently in the cavernous godowns and immense bonded warehouses, from where goods are immediately transferred to lines of steamers waiting to carry them to the clamorous merchants of the mainland. We can see that the results of this trade will be so profitable that return cargoes will be unnecessary for the successful operation of the great liners, which will return at once to San Francisco in ballast for more goods. They will have a complete monopoly owing to the application of the coastwise laws, freezing out competition. Even if there was a prospect of return cargoes, a kind, paternal and benevolent congress, having the best interests of the Islands next to its heart,—that is, in the inside pocket,—will have industriously built a few more rows of bricks and cement on that high front-yard Dingley wall encircling the private preserves, that products of the Southern Isles could not be hoisted over with a mile-high derrick.

Yes, we have visions of godowns bulging their walls with merchandise, and we also see the China firms falling over each other in a wild scramble to place their orders in this wonderful metropolis of Luzon. And then, the end of the month comes round, and we wake up; and in the words of the immortal Chimmie Fadden echo, "Not on yer life."

But the dreamers are persistent, and pester us with sure tips on the future, and we wonder where we "are at" or where we "get off," for when we think we have a fair line on our prospects, along comes a typical *boom special* from the Pasig, resplendent in a cover, which shows our little port as the center of the univer e with the trade routes of the world all diverging therefrom. About ten large liners are manoeuvering for position to enter some little cocoanut lined inlet, without colliding, and the whole appearance is one of prosperous times in the copra trade. We know our Manila, that is, we are slightly conversant with the situation here, but we give place and precedence to the enthusiasts of *The Daily Bulletin*. We are attracted by an article, the leading one in fact, from the pen of our distinguished warrior and transportation expert, Major-General Henry C. Corbin, Adjutant-General, U. S. Army, commanding the Philippines Division. We have just received a "sockdolager" from the hammer, and read and re-read the words of wisdom, to absorb the full significance of the information, and rub a little on the still aching spot.

Corbin on Manila says: "The city's geographical location, her great harbor and the new dock system which, when completed, will permit the largest ocean-going steamer to tie up alongside, indicate that this port will be the trade center of the Orient within the nevt few years, *if sufficient encouragement is given commercial interests*." We endorse General Corbin's philosophy on this point, but it is too far in the future to act as a balm for the present black and blue mark. Continuing, he says: "Manila is two days from Hongkong, five days from Shanghai, eleven from Colombo, and thirteen from Sydney," and so on till he apparently proves that Manila is the capital of Asia, Australia, Polynesia and Malaysia—that Manila is the port of ports—in fact, that Manila is IT.

And we respond: "Yes, General Corbin is a wise man. Shanghai *is* five days from Manila," and we prove it by the map. About once in six months a government transport locates an uncharted reef somewhere in the Sulu China sea, leaving a plate or so from her underworks, to mark the spot so it can be located again. And then, being under the direction of the general's sphere of influence, the vessel is ordered to Shanghai for Messrs. S. C. Farnham, Boyd & Co. to replace the part left on the reef, and it takes her five days to make the trip—maybe. Or it becomes necessary to relieve the guard at Seoul or Peking, and the transport drops in at Shanghai, on the voyage up, to allow the officers and families time to explore the wilds of Pootung or the curio shops of Hongkew. On such state occasions we are also positive that Manila is only five days from Shanghai. Once or twice a year the Asiatic Fleet moves from Cavite to Chefoo, and return, calling at Woosung for water and mails, and again we are sure the distance is five days—that is if no manoeuvers are indulged in at sea.

And then we do some lightning calculating like this: THE FAR EASTERN REVIEW was published on the 19th day of the month; in the mails on the 20th; two days to Hongkong, the 22d; three days from Hongkong to Shanghai, the 25th. All according to our "boomers" —and we reflect. It is now the 5th of the ensuing month and the American postmaster at Shanghai assures us that no mail from Manila had arrived on the British mail steamer just in from Hongkong, and we make a more favorable calculation; paper published the 19th; mailed 20th; three days to Hongkong, the 23rd; allow two days for them to wake up over there and locate the sacks and reship on north-bound steamer, the 25th; then three days to Shanghai, the 28th; one day for the mail to come from the British postoffice to the American office, the 29th; another day for the American force to resort the letters and turn them over to the Chinese authorities, the 30th; another day before the Chinese delivery is made to the office, the 31st; but we know that the latter can besqueezed up a little and the delivery generally made the next day after arrival, which should bring papers and mail in on the 29th. It is now the 5th, sixteen days from the Metropolis of the Orient, and the mail still somewhere out on the briny deep, between Woosung and Mariveles, or carried on to Japan by some previous steamer. That is where the hammer hurts.

With a sigh we return to the office and search the dictionary for additional expletives, but we have used them all. Yes, the wise general is right, and he ought to know what he is talking about. In our youth we resided in the wilds of Long Island and can bear testimony to the Corbin knowledge on transportation, distances and time-tables; and remember how, if the elder Corbin's scheme had gone through and Montauk Point made the terminus of the transatlantic steamers, the distance between Europe and New York city would have been shortened twenty-four hours, *via* the Long Island Railroad, to the lasting credit of its principal owner. If the present bearer of the great railway name would devote some of his influence and spare change to the transportation problem of the Far East, his prophetic word, about Manila might be realized in a few years, but we venture the assertion that unless capital is invested and trade encouraged, and the island ports thrown open, his estimate of our greatness will be like unto hazy dreams of the habitués of the pipe.

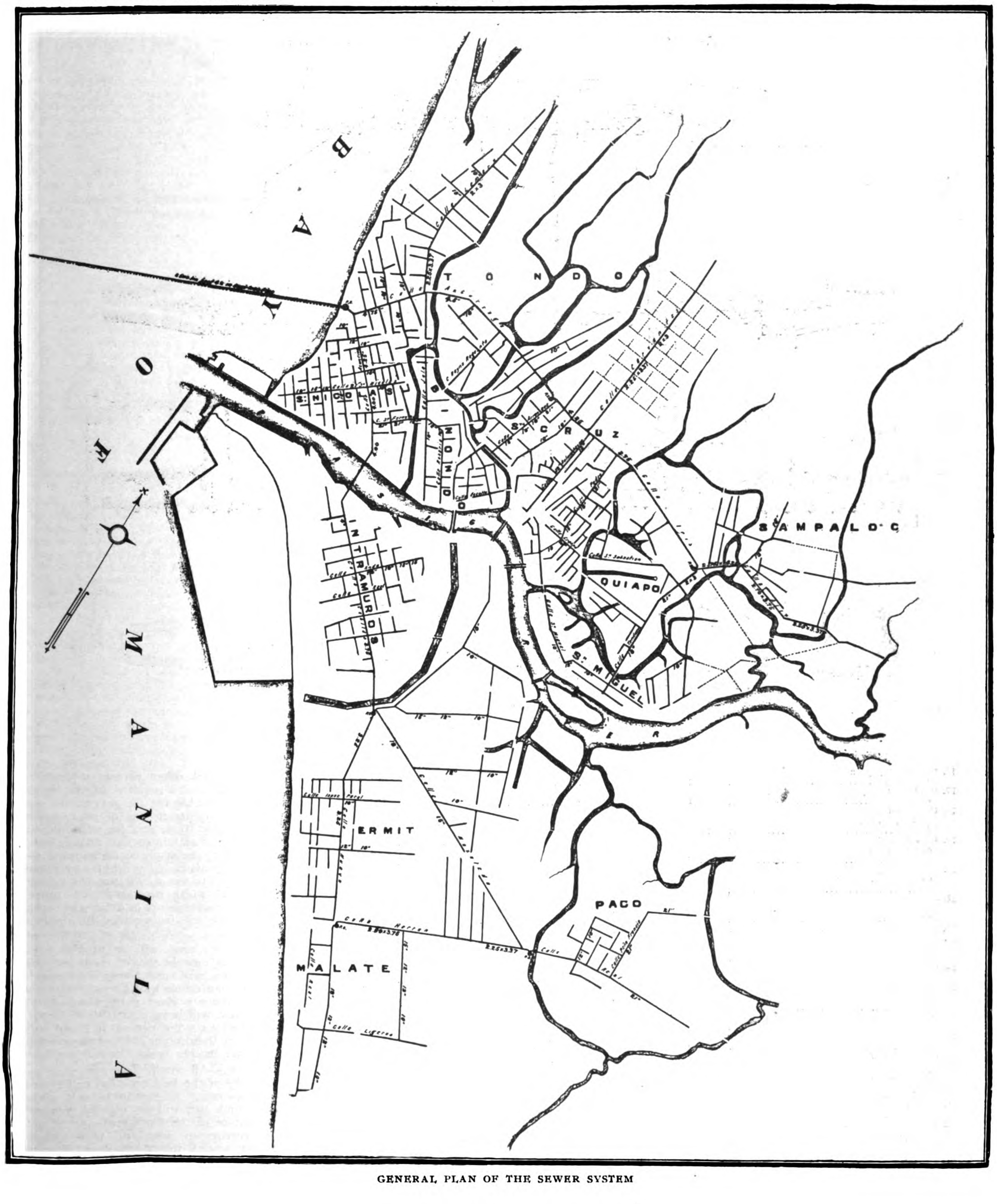
We are heartily in accord with any scheme for promoting the welfare of Manila and the Philippine Islands, and are doing our share in a steady, conservative manner, but we insist from our viewpoint that cheap "booming" at this stage is to be deprecated. The future of this port and its relation to the other trade centers of the East, depend on the cooperation of official and private enterprise; and before any headway can be made at all the mail service must be thoroughly organized, and every facility and means centered in bringing the ports of the East into closer contact. Fifteen days between Manila and Shanghai, *via* Hongkong, means seventeen to twenty days to Japan and a corresponding increase of time to the United States. Shanghai and Japan merchants can have little intercourse with Manila, when they can get the same service from America direct in about the same time.

It will be seen that all attempts to pull ourselves up by the bootstraps can only excite the ridicule of the firms on the mainland who are conversant with existing conditions, and we suggest to all who have the material progress of the Philippines at heart, and desire to see some of their fond dreams realized, to insist and work for a mail service which will pave the way for future prosperity.

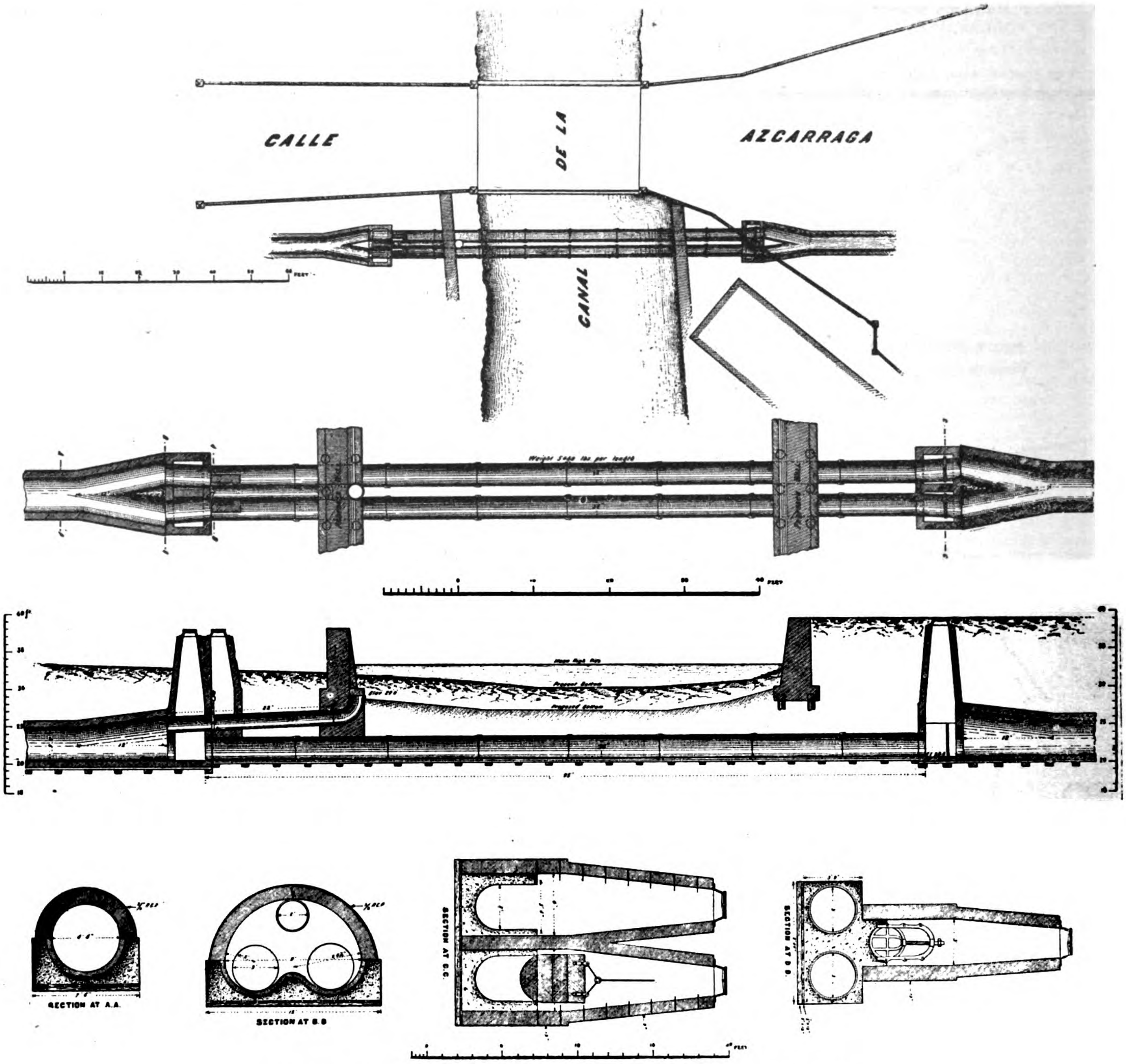
RECONSTRUCTION OF MANILA'S SEWER SYSTEM ALONG MODERN LINES

(Continued from page 111.)

12. 24-inch cast-iron flexible-joint pipe crossing of Estero de Trozo, lineal feet.................................... 223
13. Cast-iron pipe and special castings Binondo Estero crossing..lineal feet.. 103
14. Cast-iron pipe and special castings at crossing of Estero de San Jacinto, lineal feet................................ 102
15. Cast-iron pipe and special castings at crossing of Estero de San Miguel, lineal feet................................ 88



GENERAL PLAN OF THE SEWER SYSTEM



CROSSING OF ESTERO DE LA REINA REGENTE AT CALLE AZCARRAGA

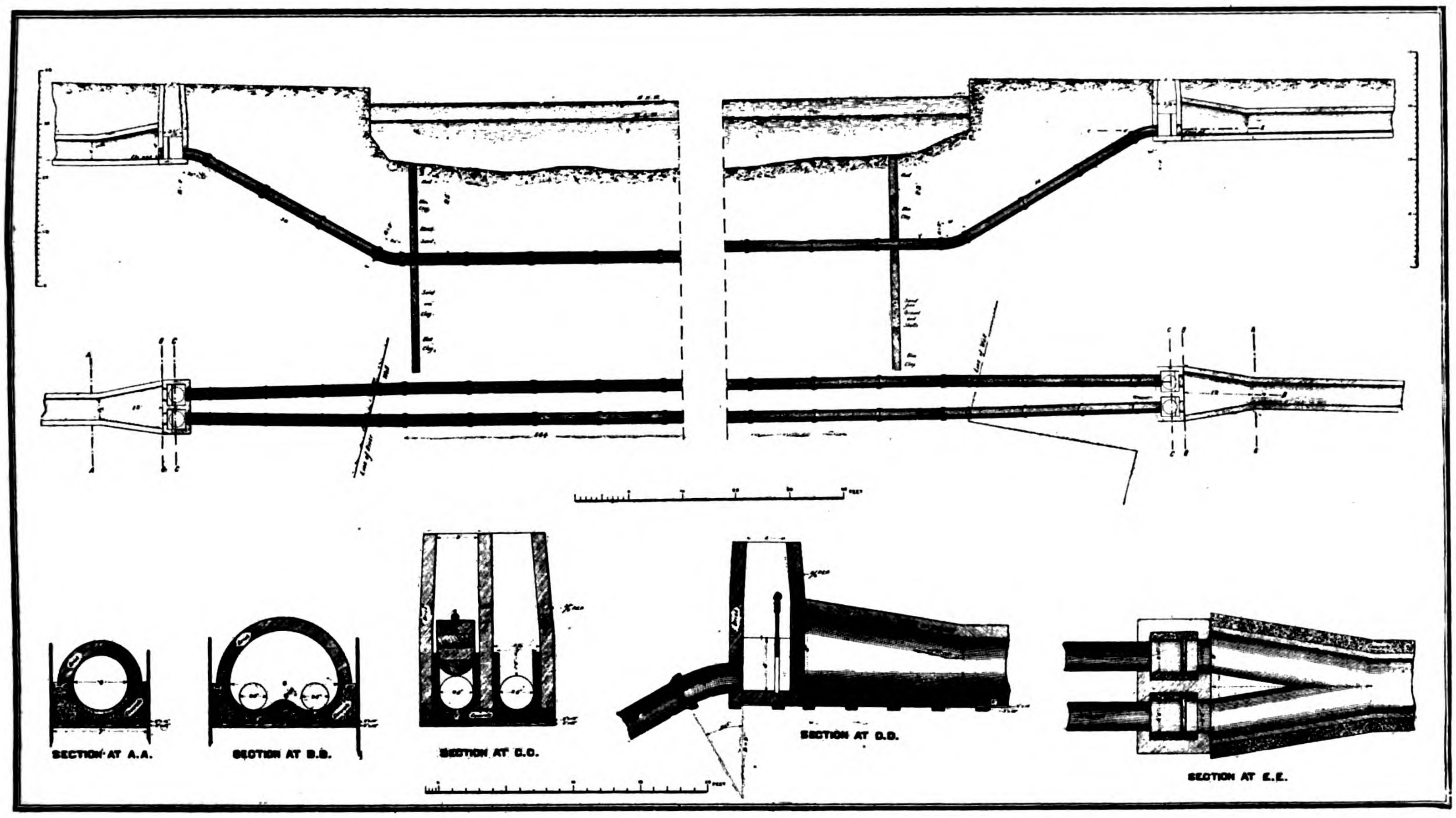
16. Cast-iron pipe at crossing of Estero de Tanduay ....lineal feet..	84
17. Cast-iron pipe at crossing of Estero de Luneta ....lineal feet..	144
18. Cast-iron pipe and special casting at and specials, at river crossing, lineal feet..	1,308
19. Cast-iron pipe and special casting at crossing of Estero de Meisic, lineal feet..	213
20. Cast-iron pipe and special casting at crossing of Estero de Bilibid, lineal feet..	156
21. Cast-iron pipe and special casting at crossing of Estero de la Reyna, lineal feet..	212
22. Earth excavation........cubic yards..	330,000
23. Concrete masonry, except outlet section, arches of main sewers, and flush tanks....................cubic yards..	19,600
24. Concrete in arches of main sewers, cubic yards............................	3,860
25. Brick masonry, except in arches of main sewers and manholes, cubic yards..	3,040
26. Brick masonry in arches of main sewers, cubic yards,....................	3,970
27. Brick masonry in manholes, cubic yards..	1,120
28. Concrete invert blocks.....lineal feet..	18,500
29. 24-inch diameter terra-cotta pipe, lineal feet..	1,620
30. 21-inch diameter terra-cotta pipe, lineal feet..	8,860
31. 18-inch diameter terra-cotta pipe, lineal feet..	8,560
32. 15-inch diameter terra-cotta pipe, lineal feet..	8,800
33. 15-inch diameter terra-cotta pipe, lineal feet..	7,350
34. 10-inch diameter terra-cotta pipe, lineal feet..	18,040
35. 8-inch diameter terra-cotta pipe, lineal feet..	169,480
36. Subdrain, 6-inch diameter terra-cotta pipe........................lineal feet..	19,400
37. 6-inch terra-cotta standpipe, lineal feet,..	9,900
38. 6-inch terra cotta V-branches, lineal feet..	3,700
39. 6-inch terra-cotta one-fourth and one-eighth bends............. lineal feet..	3,000
40. Foundation lumber under main sewers..........................feet B. M..	570.000
41. Foundation lumber under terra-cotta and cast-iron pipe sewers..feet B. M..	300,000
42. Sheeting and bracing lumber left in trench.......................feet B. M..	650,000
43. Gravel in place around 6-inch subdrain....................cubic yards..	550
44. 2-foot manhole frames and covers, number..	840
45. 3-foot cast-iron manhole frames and covers.......................number..	10
46. Flush tanks...................... do.....	370
47. 4-inch terra-cotta pipe.....lineal feet..	1,200
48. 4-inch (one fourth) terra-cotta bends, number..	400

The specifications require that the contractor shall begin work within 3 mos. after the date of the execution of the contract, and that the rate of progress will be such as is necessary for completion within the time specified, and he will so conduct the work that on or before July 1st, 1905, the whole work covered by the contract shall be completed.

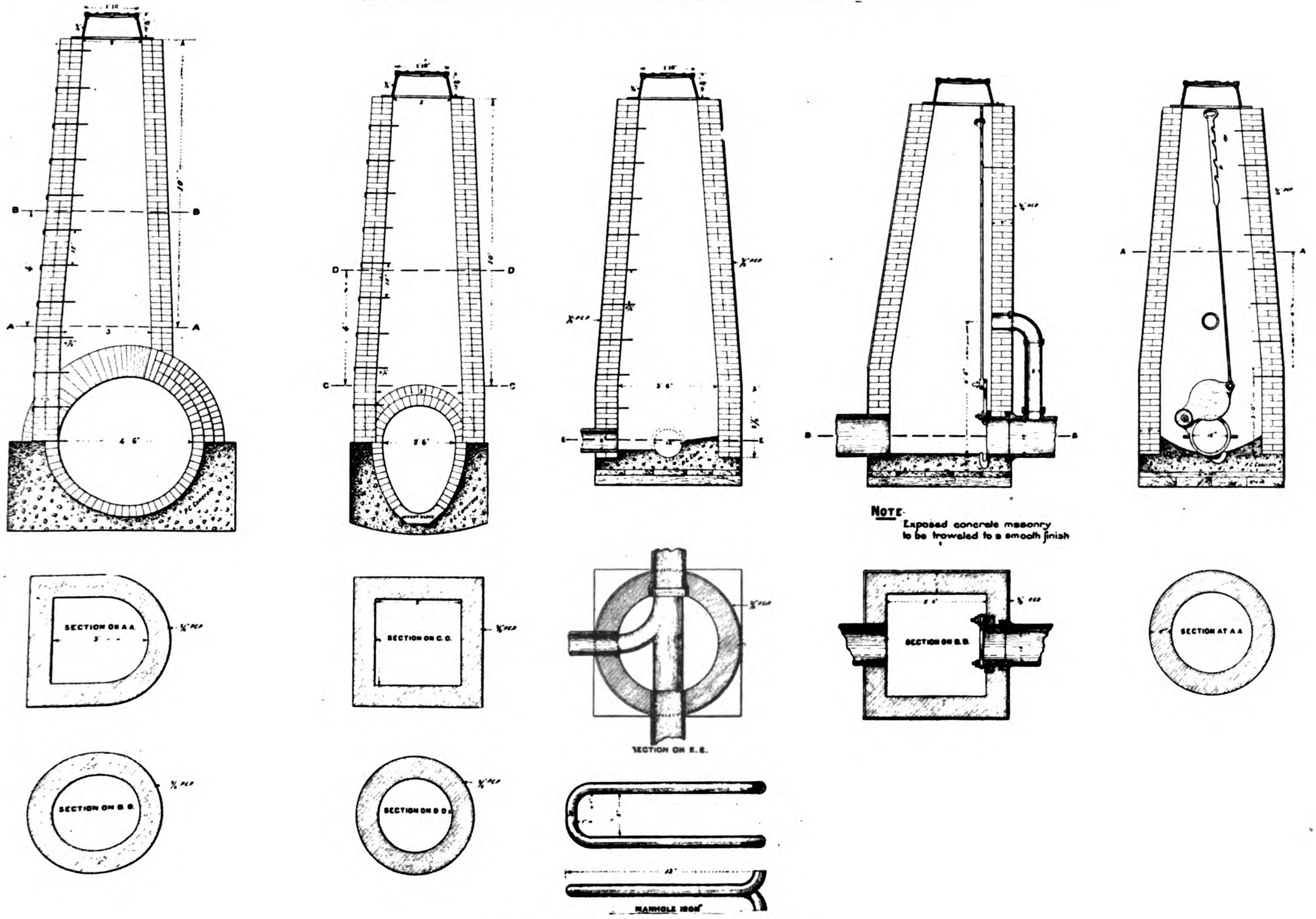
Flushing Apparatus.—The contractor will be furnished at the city property yard with all sewer gates and other necessary flushing apparatus that may be required in the work. He will be responsible for all pavements and paving material, either in line of or adjacent to the sewer excavation, and he will furnish, put in place, and maintain such sheeting, bracing, etc., as may be required to support the sides of the excavation and prevent any movement which could in any way injure the masonry, diminish the width necessary for proper drainage, or otherwise injure or delay the work. Water-tight work will be required in all construction.

Bricks.—Bricks used will be of the finest quality of whole new bricks, of uniform size, compact texture, hard burned entirely through, free from injurious cracks and flaws, tough and strong, and having a clear ring when struck together. They will have a crushing strength of not less than 4,500 lbs. per sq. in., and must not absorb more than 10 per cent of their weight of water af ter having been thoroughly dried.

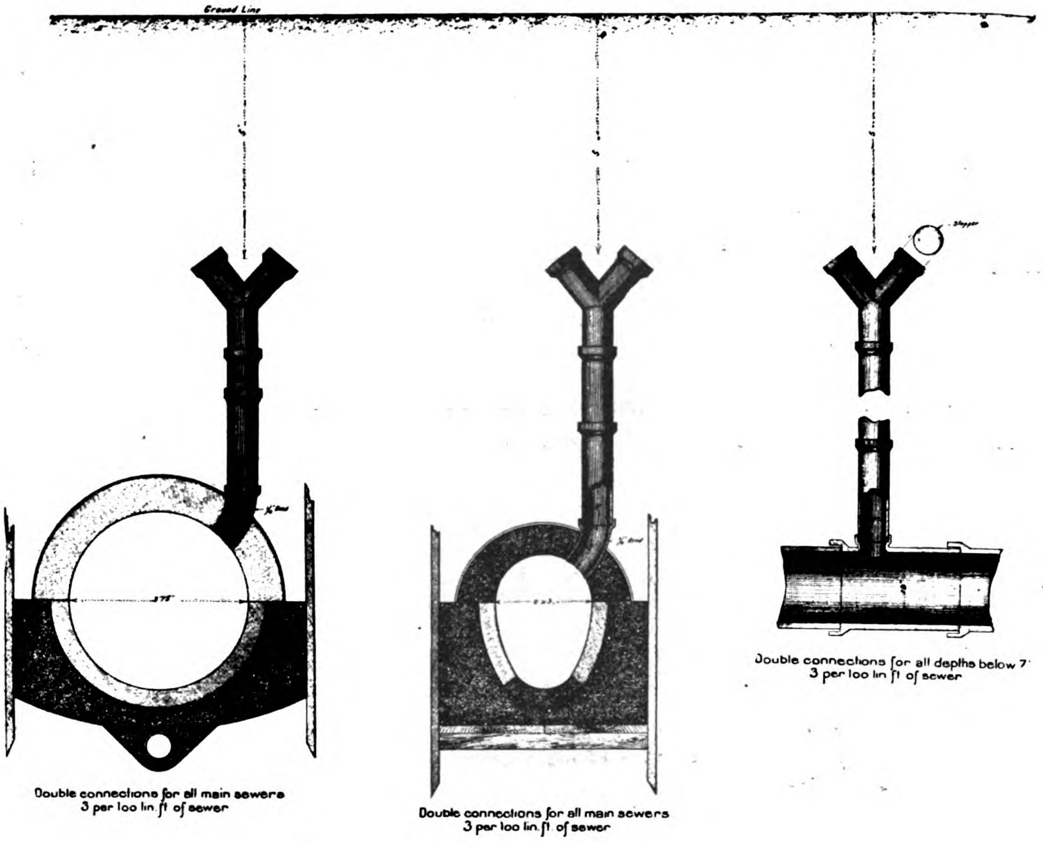
Sewer Pipe.—All vitrified sewer pipe and specials will be of the best quality, salt-glazed, vitrified stoneware. A thorough salt glaze, both inside and out, will be rigidly required. The pipe will be of the "hub-and-spigot" pattern, with corrugated, deep and wide sockets, and straight pipe 8 in. or over in diameter will lie not less that $2\frac{1}{2}$ ft. long in the trench. The body of the pipe will have a uniform thick-



CROSSING UNDER PASIG RIVER AT THE HEAD OF CALLE NUMANCIA.



TYPES OF STANDARD MANHOLES.



HOUSE CONNECTIONS.

ness of not less than that given in the following table:

Size. Inches.	Thickness. Inches.
4	½
6	⅝
8	¾
10	⅞
12	1
15	1⅛
18	1¼
21	1½
24	1⅝

The area of all pipes and specials will not be less than that of a circle of the specified diameter, and the variation in diameter will not exceed 3 per cent and will in no case be more than ½ in. All hubs and sockets will be of a sufficient diameter to receive to their full depth the spigot end of the next following pipe or special, without any clipping whatever of either, and also to leave a space of not less than ¼ in. in width all around for making a joint. All pipes and spec, ials which are designed to be straight will no- deviate more than ¼ in. from a straight linet and bends will substantially conform to the degree of curvature and general dimensions that may be required.

INVERT BLOCKS.—Invert blocks will be constructed in a suitable mould, and will be composed of one part of an approved brand of Portland cement, 1½ parts of concrete sand, and 1½ parts of stone screenings, mixed and incorporated in accor dance with the provisions for mixing concrete. These blocks must be troweled to a smooth finish on the exposed face, and become perfectly hard before being used in the work.

CEMENT.—All hydraulic cement used in the various parts of the work will be known as Portland, and will meet the following requirements: Fineness: Not less than 95 per cent will pass a 50-mesh sieve, and not less than 90 per cent will pass through a 100-mesh sieve. Time of setting: It will require at least 20 min. to develop the initial set, when mixed with the smallest quantity of water between the temperatures of 70° and 80° F. Constancy of volume: Pats of neat cement ½ in. thick with thin edges immersed in water after "hard" set must show no signs of cracking or disintegration. Tensile strength: Briquettes of neat cement 1 in. square in cross section shall develop the following ultimate tensile strength: One day (in air until hard set, rest of day in water), 250 lbs.; seven days (in air one day, in water six days), 450 lbs.; twenty-eight days (in air one day, in water twenty-seven days), 550 lbs.

SAND.—All sand used in mixing mortar shall be of the best quality.

GRAVEL.—Gravel will be from the fine bank or river gravel, thoroughly screened, free from earthly or other foreign matter, and small enough to pass through a ring 1½ in. in diameter, and will contain more than 5 per cent of material which will pass through a No. 10 sieve.

CASTINGS.—All castings will conform accurately to the dimensions on the plans, and must be free from defects. They will be first quality soft, gray iron, without admixture of inferior metal, and when broken will show a sharp gray fracture.

CAST-IRON PIPE. No pipe of full length will be accepted whose weight is more than 2 per cent less than the specified weight, nor will the average weight exceed the specified weight by more than 3 per cent. The specials will be of the same class as the straight pipe.

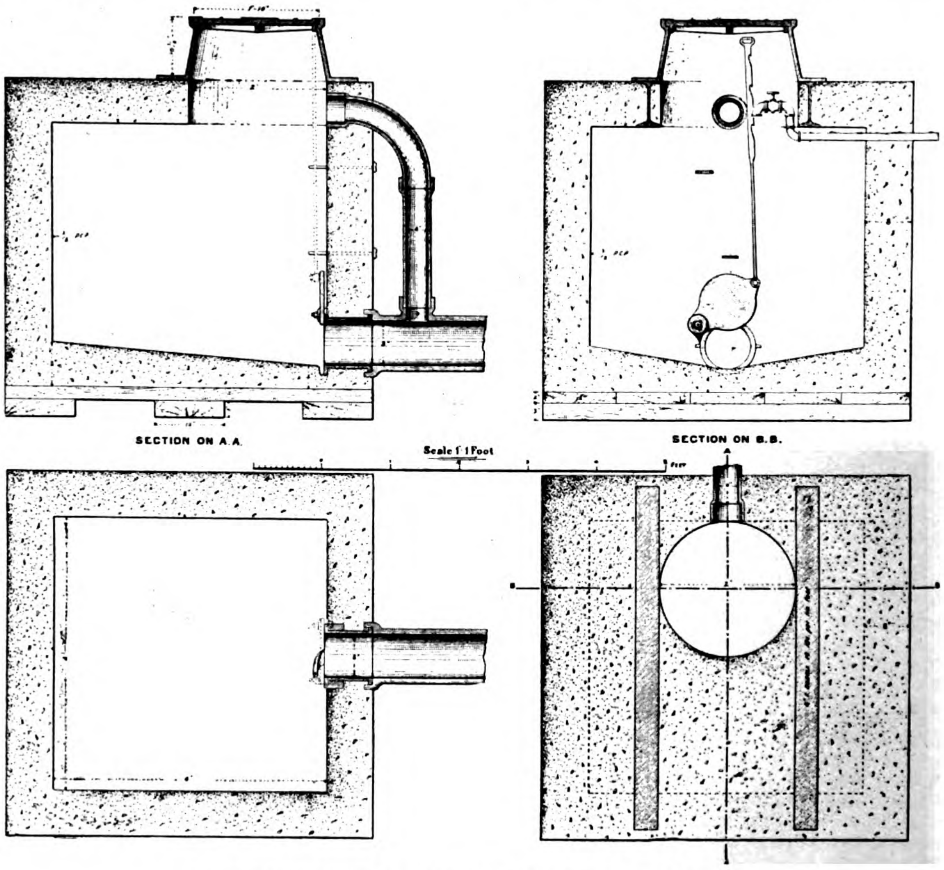
STEEL WORK.—Steel I-beams of the dimensions shown on the plans will be embedded in concrete to form the roof of each flush tank.

PILING.—Piles are to be not less than 8 in. in diameter at the small end, of live timber, straight and free from rot, large knots, wide shakes, and other defects They may be of Oregon pine or such other durable timber as the engineer may approve.

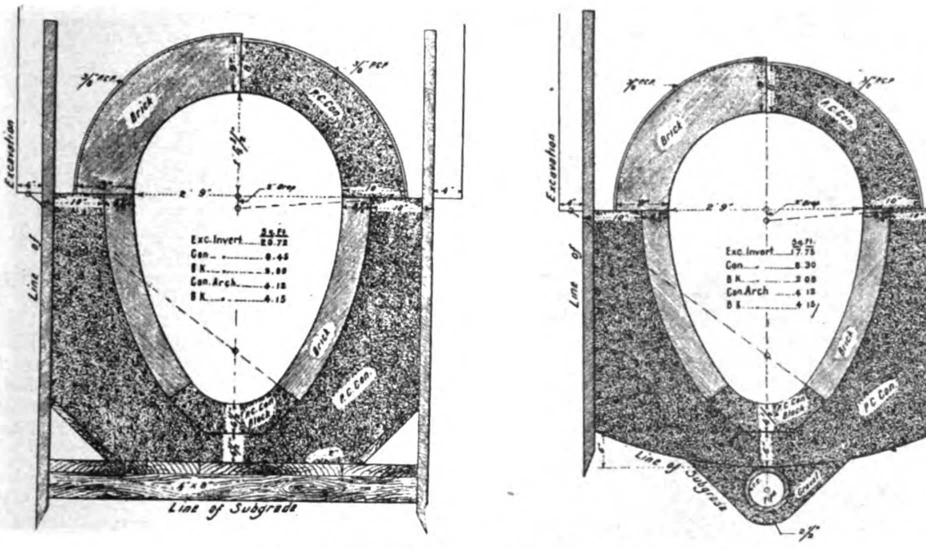
MORTAR.—Mortar used in this work, except that used in concrete masonry, will be composed of Portland cement in perfect condition and loose dry sand in the proportion of 1 bbl., weighing (net) 375 lbs., and 9 cub. in. of sand, thoroughly mixed dry, and a sufficient quantity of water afterwards added to make a rather stiff paste. It shall be used as soon as possible after the addition of the water. Mortar for pipe laying will be composed of a quick setting Portland cement, in the proportions by measure of one part of cement and one part of sand.

CONCRETE MASONRY.—Concrete masonry for use in all sewer construction will consist by measure of 1 bbl. of Portland cement (net weight 375 lbs.), 10 cub. ft. of sand, 20 cub. ft. of gravel, and water as directed by the engineer. Each batch of concrete will be spread in place in horizontal layers not exceeding 5 in. in thickness before ramming and will be at once thoroughly compacted by ramming.

MANHOLES.—Brick manholes will be constructed along the sewers wherever ordered by the engineer. The walls will generally have a thickness of 9 in. altough in special cases, where directed by the engineer, the thickness may be increased to 13 in. The price per cub. yd. of brick masonry in manholes is to include the plastering of the backs of the same with a ⅜-in. coating of cement mortar, the setting of all manhole frames and covers, the setting

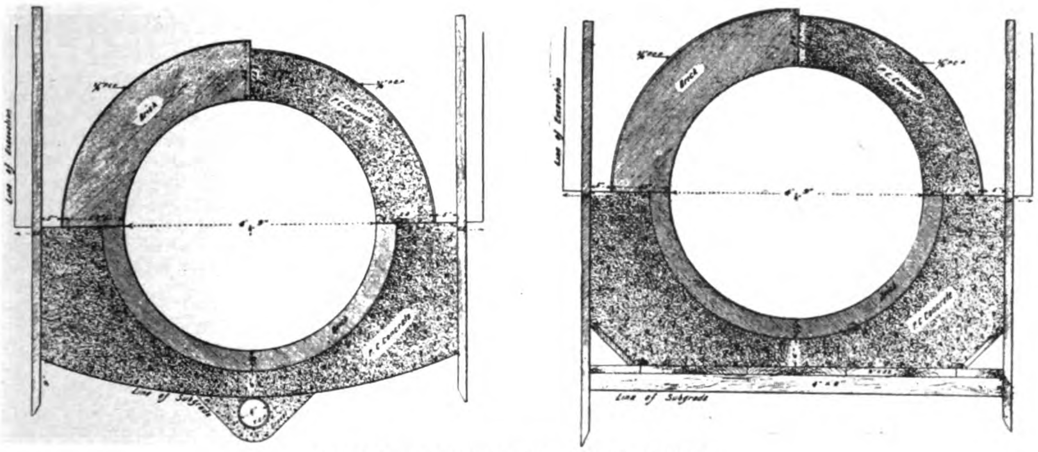


TERMINAL MANHOLE AND FLUSH TANK COMBINED.



TYPICAL SECTIONS FOR EGG-SHAPE SEWERS

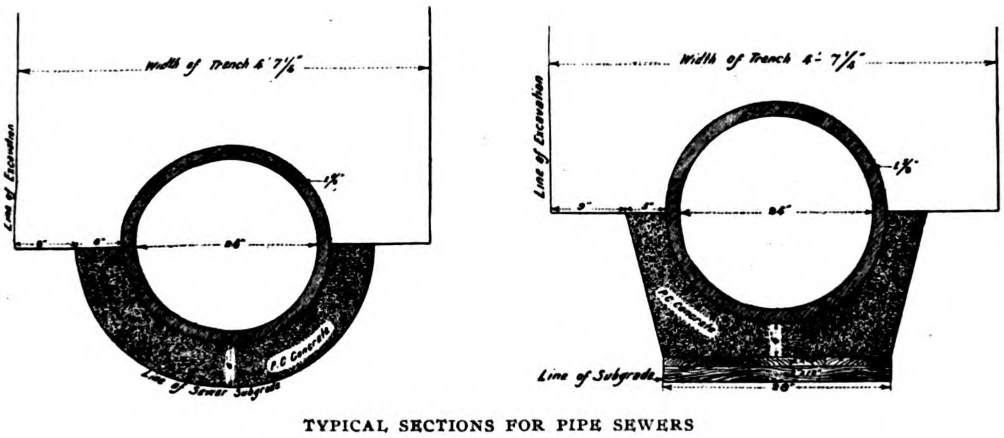
of any flushing apparatus that may be required, besides the furnishing and building in the brockwork of steps of wrought iron ¾ in. in diameter. Similar steps will be built into the sewer inverts at the manholes wherever directed. The bottom curves of all manholes will be neatly and accurately built, by using concrete masonry, concrete blocks, or brick in special cases, and so formed as to facilitate the entrance and flow of sewerage over them. All exposed concrete masonry in



TYPICAL SECTIONS FOR MAIN SEWERS

the bottoms of manholes or flush tanks will be plastered with a thin coating of cement mortar, and in every case troweled to a smooth finish.

FLUSHING TANKS.—Flushing tanks will be constructed and located at all sewer terminals. Their depth from top of manhole cover to grade or sole of sewer inside may be assumed to be 5 ft. The price bid for flush tanks will be for the same in place, complete, including setting



TYPICAL SECTIONS FOR PIPE SEWERS

of frame, cover and flushing apparatus, the furnishing and setting of all manhole irons, I-beams, water-connection pipe, and ¾-in. faucet. The flush tanks will be made water-tight by the application of a coat of Portland cement mortar to the interior of the same.

OUTFALL TERMINUS.—The terminus of the outfall into the bay will be constructed substantially as shown in details of the contract plans. The special cast-iron pipes forming the terminus will be carefully set and embedded in concrete masonry; the masonry resting on a timber platform supported by a group of piles.

RIVER SIPHON.—The siphon across the Pasig River will consist of two 24-in. cast-iron pipes, which will extend from a point near the SW. corner of the custom-house to the Maestranza laid in a dredged channel. All straight pipe used in this crossing will be composed of pipes with John F. Ward's flexible ball-and-socket joint, while all curved pipes have been designed for joints of the ordinary "hub-and-spigot" patterns. The contractor may be permitted, however, to use straight pipes with ball-and-socket joints on all curves, provided the pipes are furnished in such lengths that when laid in the trench they will practically conform to the curves shown on the contract plans. The contractor will also be permitted to introduce flexible-joint cast-iron pipe with joints of the Ward pattern at any *estero* crossing siphon, provided the pipe furnished is of the same thickness as that called for in the contract, and also provided that the city will be put to no extra expense for the introduction of the more expensive pipe. Sediment chambers, gate chambers, junction sections, and all appurtenances will be constructed at all points indicated on the contract plans and in accordance with the directions given by the engineer.

CONCESSIONS IN CHINA

The ensuing observations were written for the London *Times* by its special correspondent, Mr. J. O. P. Bland, the popular secretary of the Shanghai Municipal Council. The originals come to THE FAR EASTERN REVIEW from its Shanghai representative, who is uncertain as to whether or not the matter was ever published in the *Times*. The information, however, is of such interest, at present, that it is herewith taken up, the concluding part being held for the November issue of THE FAR EASTERN REVIEW on account of lack of space, with full credit to the *Times*. Mr. Bland's thorough insight into the situation, as it stood some time since, makes the facts set forth of great value. They follow:

I.

In a telegram sent on July 13th, 1898, to the British Minister at Peking Lord Salisbury expressed himself as follows:

"It does not seem that the battle of concessions is going well for us, and that the mass of Chinese railways, if they are ever built, will be in foreign hands is a possibility that we must face. One evil of this is that no orders for materials will come to this country. That we can not help. The other evil is that by differential rates and privileges the managers of the railways may strangle our trade. This we ought to be able by pressing that proper provisions for equal treatment be inserted in every concession."

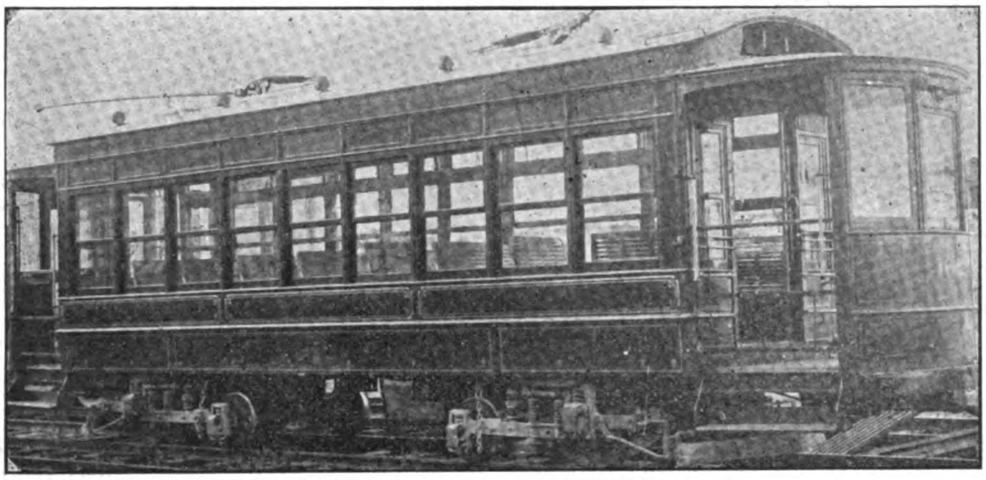
In reply Sir Claude MacDonald said:

"The battle is not, in my opinion, going against us, as your lordship suggests. Up to the present any concessions granted to other nationalities are far outbalanced in financial value by the Shansi and Honan mining and railway concessions, and by the Shanghai-Nanking railway concession with its possible extensions. I have consistently informed the Chinese Government that, as to differential rates and privileges, we want none ourselves, and can not admit that other nationalities have claim to them."

Thus the British Government in 1898. Looking back to-day on these views (even at that date subject to no little criticism) one is struck by their remarkable lack of "intelligent anticipation." Guided by the subsequent history of the Tientsin railway, noting the important part it played throughout the recent struggle, and observing the effect of the Manchuria railway on the political and commercial affairs of North China, we can only marvel at the official mind which complacently faced the possibility that "the mass of Chinese railways, if they are ever built, will be in foreign hands," and wonder at the satisfaction of his Britannic Majesty's Minister, cheerily comparing Great Britain's "score" of concessions with those of the other powers. Neither in Lord Salisbury's message nor in Sir Claude MacDonald's reply do we find anything indicative of appreciation of the fact that railway construction by foreign powers in Central China must entail consequences more far-reaching than loss of "orders for materials" or even the restriction of trade, nothing to show grasp of the simple truth that these thin lines of steel, running through and across the great Asiatic Empire

VESTIBULE ELECTRIC CARS, MANILA

The Manila Electric Railroad and Light Company is at present rapidly increasing its transportation facilities by the addition of splendid modern double-truck and double-trolley vestibule cars. This equipment is being supplied to the company by Messrs. J. G. White & Co., of New York, London and Manila, contractors and engineers, who constructed the Manila electric railroad and light system. The cars are of steel and teak, and are specially designed for tropical traffic. They each contain eighteen seats—nine on a side—and leading from vestibule to vestibule through the center of the car there is a wide aisle. The seats are comfortable and each one will accommodate two passengers. The motorman operates the car in the vestibule. This new rolling stock affords all the advantages given by the open cars with the additional one that it protects the passengers from rain during inclement weather. The Manila Electric Railroad and Light Company is leaving nothing undone to bring its service up to the highest standard, and it is safe to say that in no other city in the Far East is there a transportation system that can excel this one in the item of rolling stock.



VESTIBULE CAR, MANILA ELECTRIC RAILROAD SYSTEM

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mean so many claims effectively staked out for political influence in the near future.

The principle of "economic and geographical gravitation" (fully recognized in the Anglo-Russian Railways Agreement of April, 1899, and in our Wei-hai-wei "assurances" to Germany) appears then to have been entirely overlooked; nor in the Government's handling of this question to-day do we see any trace of its existence. I propose in the following résumé to bring the history of the "Battle of Concession" up to date; from that history, and from the existing situation, certain conclusions will, I venture to think, be brought home to the plain man.

At the time of Lord Salisbury's message above referred to, there was, as he then said, much anxiety in London in regard to three railways, viz., the lines from Peking to Han-kau, from Shanghai to Nanking, and from Peking to Chin-kiang. With regard to the last named, which his lordship regarded as the most important, there occurs in a Foreign Office message of July 16, 1898, the following interesting passage:—

Great fear is expressed by a syndicate connected with the Hongkong Bank that, on the lapse of the present Chinese concession, it will fall into foreign hands. If they can get a subsidy from the British Government, they are prepared to offer for it. But they are not likely to get this.

Before that date—in April—Messrs. Jardine Matheson and Co. had already joined with the Hongkong and Shanghai Banking Corporation in the formation of the combination thenceforth to be known as the British and Chinese Corporation; in a letter to the Foreign Office, Sir Ewen Cameron foreshadows the labors of this "strong, representative, and influential syndicate," and, coming at once to business, saps:—The proposed line between Shanghai, Su-chau, and Nanking will, in the first place, engage our special attention. The line will run through one of the richest and most populous districts of China.

It will help to open up the country, and, as the line is sure to prove remunerative, it will also stimulate similar enterprises in other directions greatly to the advantage of British trade.

Thus matters stood in the summer of 1898. The new corporations were not by any means alone in these fields of British enterprise, even at that date; many were the hopeful pioneers—as the blue-books attest—who left cards and correspondence at the British Legation to mark a futile residence in the City of Dreadful Dirt; but it is no exaggeration of the facts to say, as your Peking Correspondent has frankly said, that "this favored corporation has been able since then to command almost a monopoly of the British Government's support."

Between April and August, 1898, Sir Claude McDonald was engaged with the Yamen in various negotiations on behalf of British interests. In many a preliminary agreement was signed between "Jardine's Syndicate" and Sheng Ta-jen for the Nanking railway, in regard to which it is interesting to note that the Minister said:—"They ought to get the concession, providing that they do not haggle over terms and delay matters."

On the 21st of the same month an agreement was made at Peking between the Peking Syndicate and the Shansi Bureau of Trade in regard to valuable mining concession in that province. At the same time overtures had been made for the trunk line concession from Peking to Han-kau. The history of that enterprise is so fresh in the public mind that I need not refer to it here; suffice it to say that China's breach of faith, in ratifying the so-called Belgian agreement, was made the occasion of a formal demand for compensatory advantages claimed by Great Britain. China, in compliance with this demand, consented "in terms of apology," on September 14, that the following lines should be constructed by British syndicates on terms not inferior to those of the Belgian concession, viz:–

1. Canton to Kau-lung (opposite to Hong-Kong).

2. Shanghai to Nanking, with extension via Chinkiang to Sinyang.

3. Hang-chau to Su-chau, with extension to Ningpo, if necessary.

The "Jardine Syndicate," as we have seen, had already made a preliminary contract for the second of these railways. The rights obtained under the above agreement were, however, specifically British and not individual rights—a point of great importance which, had it not been for the "monopoly of British Government support" given to the British and Chinese Corporation, should long since have proved valuable to Chinese and British interests alike. Though restricted in utility by that monopoly, the agreement still possesses protective force.

In November Lord Charles Beresford was at Peking, where his inquiring mind naturally turned itself to the question of railway and mining concessions. For his information Sir Claude McDonald placed on record, in an historic document, the total British "bag" up to November 2, 1898.

In a covering letter he observes:—"Herewith, as requested, the list of concessions granted to us up to date; also a list comparing what we have got with what other nations have. We do not seem to have come out second best." The total length of the lines named as British concessions he estimates at 2,800 miles, but, as the list includes the Han-kau-Canton railway and the Burma-Yunnan-Yangtsze system, it will require considerable revision whenever the profit and loss account comes to be balanced again.

The concession referred to in detail by the British Minister may be summarized as follows:–

1. The Peking Syndicate's concession in Shansi, North Ho-nan, and Che kiang.
2. The British and Chinese Corporation's concession for the Nanking railway and its possible extensions.
3. The British and Chinese Corporation's concession for the Su Chau-Hang-chau Ningpo railway.
4. The British and Chinese Corporation's concession for the Kaulung-Canton railway.
5. The British and Chinese Corporation's half interest in the Nan P'iao coal mines (near Shan-hai-kwan).
6. The Hongkong and Shanghai Bank's financial control of the Peking-Tientsin-Niuchwang system.
7. The British and Chinese Corporation's third interest in the Tientsin Chinkiang railway.

These, together with the above-mentioned interest in the Han-kau-Canton trunk line and the vague right to "extend the Burma system into China," complete the list. If we now inquire how these enterprises have fared since November, 1898, the result may be briefly expressed. In the words of your Peking Correspondent:—"Not a foot has been sunk in any mine nor a sod turned of any railway in all these vaunted concessions." Yet all these years and to this day they have blocked the way for others, and the failure of these British syndicates to carry out their written agreements has not only affected our good name in China, but has prejudiced the whole cause of bona fide industrial enterprise.

And who is to blame? Partly, no doubt, the Government, which has failed to recognize certain stern but obvious facts inherent to the question, chief of which is the impossibility of separating its commercial from its political aspects; partly, also, the concessionaires, whose apparent object has been to float these concessions on the market at some favorable opportunity, and who, failing that opportunity, are content to bide their time, regardless of the political and commercial considerations involved, and relying on their "monopoly of Government support" to prevent others from taking over the work. That the Boer war and the Boxer troubles have affected the market may be admitted; yet from the Chinese point of view—and these, after all, are Chinese railways and mines—the fact remains that Belgians, Americans, and French, not to say other British combinations, are ready and willing to take over concessions which these British syndicates have been unwilling either to surrender or to develop. It is obvious that such a state of affairs cannot continue indefinitely. The British Minister appears to have realized at an early stage of the proceedings how matters stood. On August 21, 1898, in a telegram to Mr. Balfour, he observed:—"The negotiations for the Yangtsze railways have been much delayed and I myself have been greatly embarrassed by the absence of the syndicate's engineer, who was due a month ago and has not arrived

yet." On September 30 he telegraphed to Lord Salisbury in regard to the Peking Syndicate's inaction.—

An exceedingly bad impression has been created here, and any future British undertakings in this country will be detrimentally affected by the fact that the syndicate has not yet commenced operations.

The agreement was signed on May 21 last, and in April, at the request, and relying on the assurances, of M. Luzzatti, the Syndicate's agent, the Italian Chargé d'Affaires, and I informed the Chinese Government that the engineers, machinery, and money were all ready, and the commencement of work was only awaiting the signature of the agreement.

The Chinese Government, entirely failing to appreciate the exigencies of western finance, came to the unavoidable conclusion that the contracts signed with these syndicates were binding on one side only; it was therefore hardly a matter for surprise that in December an edict was issued to the effect that, in the words of a Legation despatch, "the Chinese Government will grant no new railway concessions on any conditions, until some of the lines already granted have been contructed." In a subsequent edict on mining concessions, dated July 30, 1899, the following noteworthy passage occurs:—

The present regulations provide that all enterprises must be commenced within six months from the date of sanction, under penalty of cancellation, but it is also provided that special cases are excepted from this rule. The result is that pretexts for delay are advanced so as to make a show of marking out claims without commencing genuine operations, and it is now necessary to define a strict limit of time. From the date of sanction the total limit shall be ten months, and, no matter whether there are any special reason or not, if this period is exceeded without operations being begun, the sanction given shall be cancelled.

That there was reasonable necessity for such provision by the Chinese Government, ever abused for necessary delays, must be admitted; but it is a curious fact that they should in the first instance have signed preliminary agreements without any time limit.

The position of affairs indicated in these edicts remains practically unchanged to-day. There are, it is true, at this moment of writing, certain signs of unusual activity in London—to which I propose to refer later—but if Jardine's Syndicate's latest proposals (December, 1901), for an amended Nanking railway agreement, are to be taken as indicaative of their serious intentions, the time for British enterprise in China, under these auspices, is not yet.

I propose in another article to describe briefly the position of the concession referred to in Sir Claude MacDonald's list of November 1898; to point out the causes which have led to the present impasse and, if possible, to point a moral which may appeal to the unofficial mind.

II.

The list of British concessions compiled by Sir Claude MacDonald in November, 1898, as has been shown, practically refers to the agreements made by the Chinese Government with the Peking Syndicate and the British and Chinese Corporation. The only other combination mentioned is the Yunnan Company; but our admitted right to extend the Burma railway system via Yunnan to the Yang-tsze is likely to remain unexploited so long as expert opinion in regard to the financial possibilities of the scheme remains as at present. For all practical purposes it will, therefore, suffice to review the Peking Syndicate's position and that of the British and Chinese Corporation.

Of the Peking Syndicate's Shansi and North Ho-nan concessions it will be remembered that the British Minister's opinion of their financial value has been recorded in glowing terms. That the great coal and iron fields included in the syndicate's agreements are rich and easily workable is beyond question; for practical purposes, however, the value of the concession in foreign hands depends entirely on the facilities provided for transporting minerals to the Yang-tsze. In an article published on this subject in *The Times*, August, 1898, the present writer made the following observations:

It is obvious that the value of these mining rights must depend to a very great extent upon the firmness or complaisance which may hereafter be shown by the British Government not only in dealing with the Chinese, but with those Powers whose evident object it is to close the door on every kind of British enterprise. The best opinion in China as to the value of the Anglo-Italian (Peking) syndicate's concessions are agreed that, if energetically exploited and supported, they must undoubtedly prove of great industrial importance and lead to a much-desired opening up of a large area of country hitherto untapped. There exists, however, at the same time, a widely-spread impression that the present enterprise is connected rather with the field of finance at home than with that of genuine enterprise in China, and it is generally felt that the promoters of the "Peking Syndicate Limited" are more concerned with the successful floating of the Company in London than with the future development of the resources of Shan-se. As regards the export of fuel to the Yang-tsze and coast ports, the future of Shan-se as an important source of supply will entirely depend upon the adequacy and directness of the routes of communication established.

These views have been largely confirmed during the past four years, though it is only fair to state that under its present organizations and control the Peking Syndicate's operations have been entirely removed from the sphere of speculative finance to that of a bona fide commercial and industrial undertaking, and that for some time past everything possible has been done by the directors and their able representative in China (Mr. George Jamieson, C. M. G.) to remove the disabilities which have hitherto blocked all progress. A party of engineers is now on its way to the mines, there to commence operations by the construction of a railway from Tsechou to Weihui on the Grand Canal, to connect hereafter with the Luhan railway running south to Kaifengfu. Space does not permit me to describe at length the protected and hitherto futile efforts made by the syndicate, since its abandonment of the Siang-yang route to the Han river, to establish direct communication between the mines and the Yang-tsze, but a brief explanation of the facts is necessary. By Article 17 of the Shansi contract it was agreed that:—

Whenever it may be necessary for any mines to make roads, build bridges, open or deepen rivers or canals, or construct branch railway to connect with main lines or with water navigation to facilitate transport of Shan-si coal, iron, and all other mineral products from the province, the syndicate on reporting to the governor of Shan-si is authorized to proceed with the works, using its own capital, without asking for Government funds.

The syndicate, realizing that to bring its products northwards to Tientsin was, financially and practically speaking, impracticable, naturally interpreted this clause, from a common-sense stand-point, to imply "water communication" of a satisfactory nature. The Chinese Government, however, swayed by a certain political influence brought to bear upon them at Peking, denied this right. Eventually, as part settlement of the Lu-han "breach of faith" episode, the syndicate obtained permission to construct a railway from the mines to the Han river "as an outlet to the Yang-tsze," but this route had to be abandoned later on economic ground. The right to connect the mines with the Yang-tsze having been specifically admitted, it might have been supposed that to exchange one route for another should not have been a task beyond the resources of British diplomacy, yet the fact remains that for the past four years the Chinese Government has been able to nullify the spirit and the letter of their agreement. The fact will be found fully recorded in the Blue books, in which it is shown that the Siang-yang route was arranged with the Yaman on the undertaking that the place was in navigable communication with the Yang-tsze, a condition which subsequent inquiries proved only to be adequately fulfilled at certain seasons of the year. The Chinese Government's chief objections to the Pokou line have been based on its possible competition with the Luhan railway; a glance at the map will show what this consideration is worth. A further objection has been raised—and, unfortunately, allowed to stand—that the syndicate's mining operations should precede construction of railways; but, unless the products of the mines are to accumulate indefinitely at the pits' mouths, it is difficult to see why such an argument should be seriously considered. That our Foreign Office failed to insist on the fulfilment of the syndicate's contract by China is matter for regret, and proves that the importance of the concession, in its relation to British interests in Central China, has not been realized. In the absence of direct communication with the Yang tsze, work of development was necessarily checked by the state of affairs existing in Shan-si and Ho nan during the Boxer rising; but with the restoration of order it is imperative, unless this valuable concession is to pass out of the British control, that our Government should insist on the contract being made effective without further delay.

As regards the British and Chinese Corporation's agreements the case is different. Definite preliminary contracts were entered into by the corporation in 1898 for the construction of the lines from Shanghai to Nanking, from Canton to Kau-lung, and from Su-chau to Hang-chau. Another agreement was made, in combination with a German syndicate, for constructing and financing the trunk line from Tientsin to Chin-kiang; no satisfactory explanation has yet been given, either by the corporation or by the British Government which demanded these concessions, for their non-fulfilment. Their existence has been officially used by the Legation as a reason for not supporting rival British undertakings. It is difficult to set side the fact that Belgian, French, and American capital has been forthcoming for enterprises specifically undertaken on terms not more advantageous than those of the corporation's agreement. Again it cannot be denied that active operations on the Han-kau-Canton railway, in which the British and Chinese Corporation was originally interested with the American syndicate, would not have been taken in hand by the latter had it not been for the introduction of a predominant Belgian interest in the undertaking.

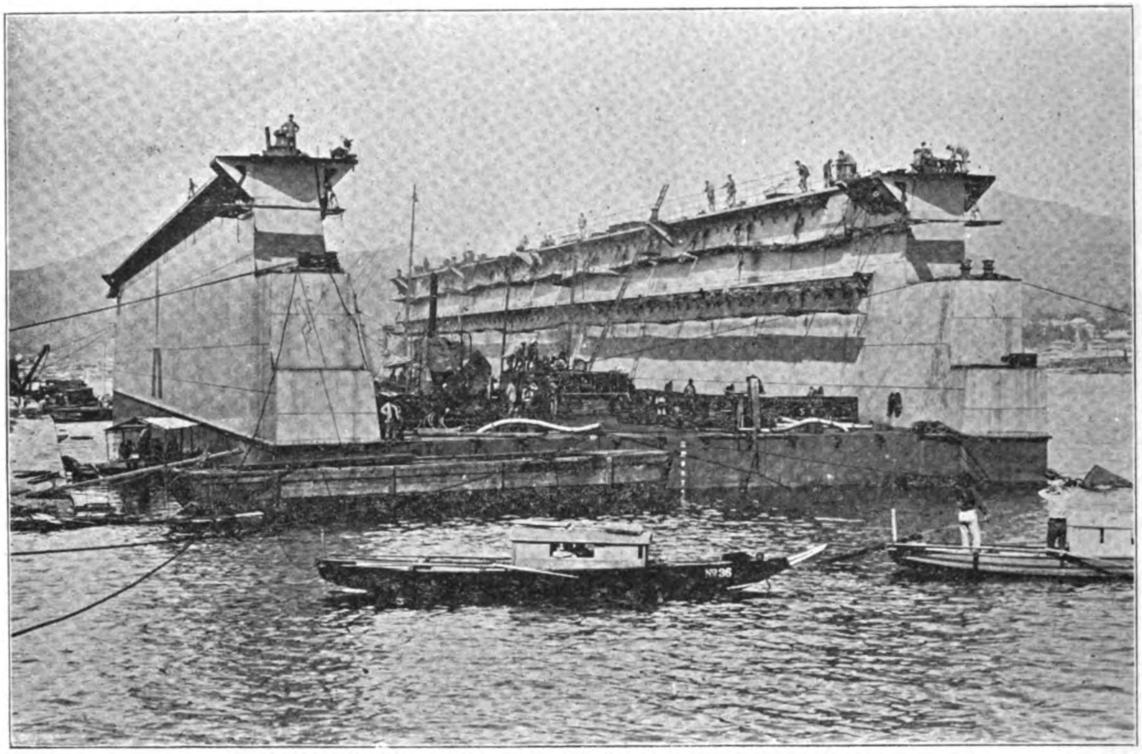
(How that Belgian interest was secured in New York space does not permit here to tell, but the episode throws an instructive sidelight on the unseen political undercurrents affecting this question).

(To be continued)

S. C. FARNHAM, BOYD & CO. LTD

In our August issue we published an extract from the *Trade Report and Returns of Tientsin*, 1904, emanating from the Imperial Commissioner of Customs at that port. Under the sub-heading dedicated to the material progress of the port, the commissioner states as follows: "An enterprise of some magnitude was started during the year of a lighter service under the direction of Messrs. Butterfield & Swire, consisting of seventeen lighters and four powerful tugs built in Europe and sent out in sections, which were fitted out in Shanghai and then sent oversea to Tientsin." In justice to Messrs. Farnham, Boyd & Co. Ltd., and their high reputation for constructing boats of this class, we take opportunity to point out that the four large tugs, hulls, boilers and engines, were built entirely at the works of the firm at Shanghai.

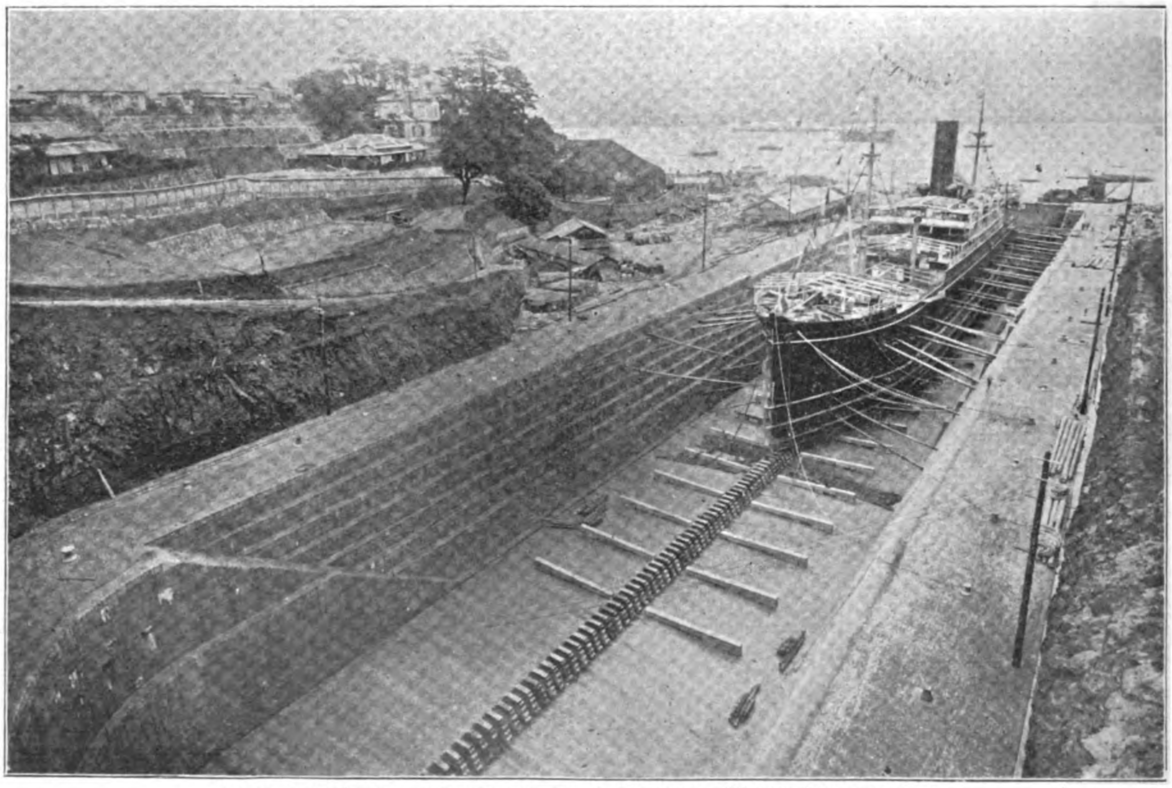
SHIPBUILDING ENTERPRISE OF THE MITSU BISHI COMPANY IN JAPAN



MAMMOTH FLOATING DOCK OF THE MITSU BISHI COMPANY

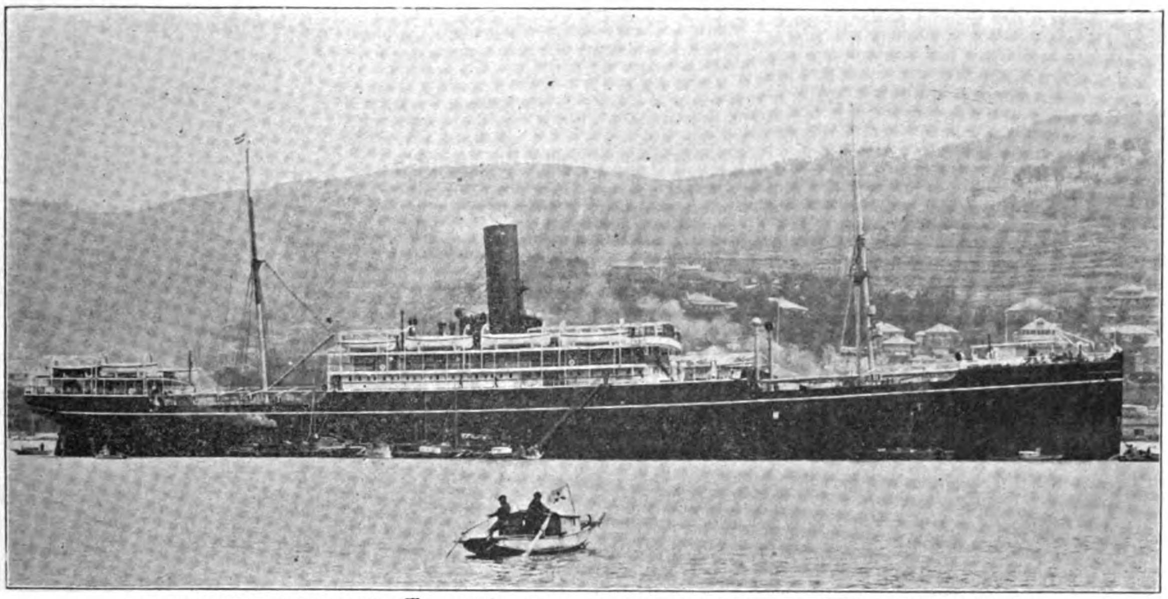
The greatest surprise which we can imagine a stranger, visiting Nagasaki for the first time, says *Cherry Blossoms*, the *Nagasaki Press* monthly, could experience, would be when told on entering the harbor that on the western shore was a shipyard which has the distinction of having built the largest steamship ever constructed in an Asiatic yard, possibly the largest drydock E. of Suez, and capable of constructing a floating dock with a lifting power of 7,000 tons. * He looks away to the spot indicated, and the only structure which appears to him to be commensurate with such performances is a huge shears; the building looks nothing, and hills appear to rise too abruptly from the water's edge for such things to be possible. Looking more closely, the stranger is astonished to see the funnel and masts of a large steamer rising up from the bluff, and then he begins to think there may be some truth in the statement.

LARGEST STEAMER EVER BUILT IN JAPAN.—The largest steamer ever built in Japan is *Tango-maru*, constructed by the Mitsu Bishi Dockyard and Engine Works for the Nippon Yusen Kaisha (Japan Mail Steamship Company). The keel was laid down in February, 1905, and, in spite of hindrances caused by the war, the hull was launched on December 12th, 1904. The steamer was built and engined to meet the requirements of Lloyds' and the Japanese Shipbuilding Act, and she is registered at Lloyds' 100 A1. Her dimensions are as follows:



MITSU BISHI'S NO. 3 DOCK, SHOWING STEAMER *Tango-Maru* DOCKED

* Illustrations courtesy of *Cherry Blossoms*



NIPPON YUSEN KAISHA'S *Tango-Maru*, THE LARGEST STEAMER EVER BUILT IN JAPAN.

—Length between perpendiculars, 445 ft.; breadth, 52 ft.; depth, 33 ft. 6 in. The gross tonnage is 7,463 tons, and the indicated horse-power 6,503. The specifications of the vessel called for a speed of 15 knots, but on her trial trip she made 15.6, quite a substantial increase. Her dead-weight capacity is 7,300.

This steamship was intended for the Nippon Yusen Kaisha's Seattle service and was fitted to take 60 first-class, 24 second-class, and about 300 steerage passengers. The cabins, saloons, etc., were constructed and furnished on the most modern principles, and there can be no doubt the vessel would have proved a formidable competitor to the best foreign steamers on the route. Unfortunately, when completed, the government chartered *Tango-maru* for the transport service, and builders and owners lose a splendid advertisement which the first voyage of such a fine vessel would undoubtedly have proved.

MITSU BISHI'S NO. 3 DOCK.—The No. 3 dock is a striking illustration of the foresight displayed by the management of the company in the conduct of its business. It was commenced in January, 1902, at which time there was no merchant vessel built or building long enough to fill it by 100 ft. It can accommodate any vessel at present afloat, including the White Star liner *Baltic*. The accompanying illustration of *Tango-maru*, in dock shows how far ahead the docking capacity is of Japanese shipping, On June 26th last, the Great Northern Steamship Company's mammoth steamer *Minnesota*, of 20,718 tons, was docked in it, and there was more than 80 ft. to spare in length and an equivalent space in breadth. This is the only dock on this side of the Pacific capable of accommodating *Minnesota*. There is a dock in Seattle large enough to take the vessel, but the steamship company preferred that the first annual inspection by Lloyds' surveyor should take place at Nagasaki. The officers of *Minnesota* were greatly surprised at the ability shown by the dockyard officials in docking their ship. Only 40 min. elapsed between the time that the vessel left the buoy in mid-stream and the starting of the pumps for emptying the dock; and there are few mercantile ports in the world where *Minnesota* could be docked at low tide as she was in Nagasaki.

The No. 3 dock was 3 yrs. and 2 mos. in course of construction; a long period, but it must be remembered that the whole of the dock was hewn out of solid rock, the greater portion of the work being done by blasting. The dock holds about 76,000 tons of water, necessitating the most up-to-date pumping arrangements, and it is needless to say that they are there. The extreme length of the dock on the bottom is 722 ft., on blocks 714 ft.; width of entrance on top 96½ ft., on bottom 88½ ft.; water on blocks at spring tide 34½ ft.

MAMMOTH FLOATING DOCK.—The floating dock was constructed by the Mitsu Bishi Company for use at the repairing yard it has established near Kobe. The scarcity of land at Nagasaki for the extension of its dockyard, and the ever-increasing importance of Kobe as a commercial port are the two main reasons which induced the company to start operations at the northern port.

The Mitsu Bishi Company's floating dock was commenced in April, 1903, and completed in June, 1905. It is constructed entirely of steel, and it is patent to a tyro in shipping matters that the launch of such an affair must have been a matter of great concern to the builders. The dock rests upon five pontoons, and it is usual to launch floating docks section by section putting them together when afloat. This method, however, did not satisfy the company and it decided to attempt to launch it as a whole. To this end a special slipway was designed, and on May 4th, 1905, the builders had the satisfaction of having created a record by the successful launching of a floating dock, entire.

The dimensions of the floating dock are as follows:—Length, 387 ft. 6½ in.; length over all, 412 ft. 6½ in.; breadth, 85 ft. 0½ in.; depth, 41 ft. 7¼ in. Its lifting power is 7,000 tons. Before departure from Nagasaki the floating dock was tested in the harbor. The company's steamer *Fukura-maru*, 1,938 tons, was successfully drydocked, the entire operation, including the sinking of the dock to receive the vessel, taking only 4½ hrs. On July 5th the dock left Nagasaki for Kobe, being towed by *Fukura-maru*, and reached its destination in safety four days later.

BRIEF HISTORY OF THE COMPANY.—In 1855, the Tokugawa Government requested the Dutch Government to supply them with the machinery necessary for the equipment of a shipyard, also to send out skilled artisans as instructors for the Japanese. Men and machinery arrived at Nagasaki in 1857 and work was commenced at Akunoura, the village where the main offices and the engine works are now situated. These works were completed in 1861, and were intended solely for repairing and instructional purposes. In 1862, the authorities made an application to the Dutch Government for workmen and equipment to start a shipbuilding yard. Two years later, the erection of a building yard was commenced at Tategami, a village separated by a small hill from Akunoura. Preparations were made for building men-of-war but only a few unarmed steamers were constructed, the yard being used mainly for repairs. In 1876, the *Kosuge-maru*, a steamship of 1,500 tons, which is still in use, we believe, was laid down at Nagasaki. Eight year later the ownership of the dockyard was transferred from the government to the Mitsu Bishi Company, under whose control the business has prospered so much as to leave it almost without a serious rival in Japan, or indeed in the Far East.

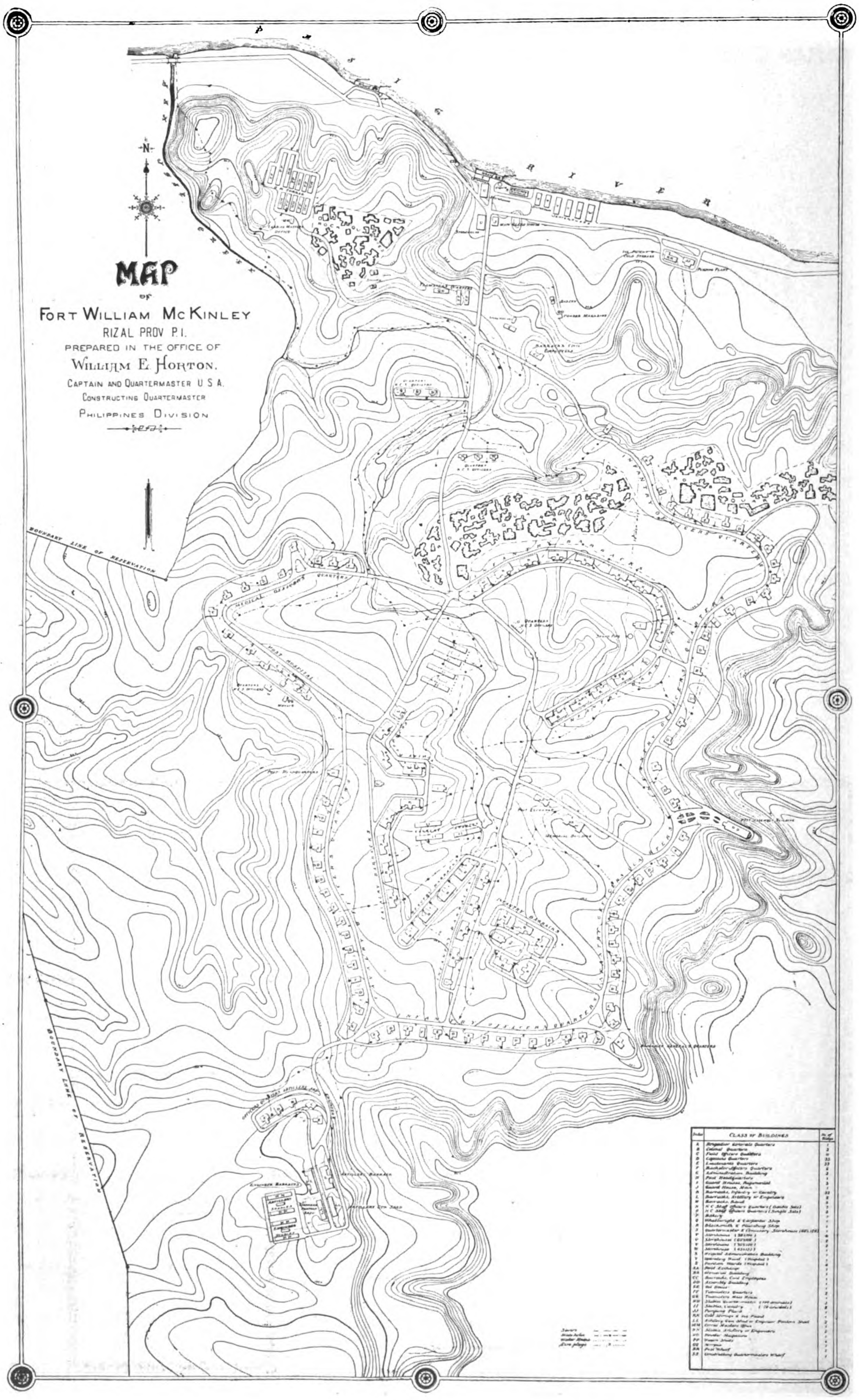
The next few years should witness a wonderful progress in the quantity of work turned out. Contracts were recently signed for the construction of two steamers of 13,000 tons each for the Toyo Kisen Kaisha, to be completed in 1907, and one of 7,000 tons for the Nippon Yusen Kaisha.

WHANGPU CONSERVANCY

The agreement of the Whangpu Conservancy Board proposed by China and endorsed by the diplomatic body has, after long delay and discussion, been signed, according to *The Celestial Empire*, and the River Whangpu will now be properly improved. The improvement will be under the joint supervision of the Shanghai taotai and commissioner of Imperial Chinese Maritime Customs in Shanghai, and the expenses thereof will be defrayed by the Chinese Government at the rate of Tls. 460,000 *per annum* for 20 yrs., the income of opium taxes of Szechuan and of Hsu Chow-fu of Kiangsu being the security. The new conservancy board will have charge of the river police, light-houses, light-ships, pilots, buoys and quarantine, while it retains the right of giving permission to build hulks, docks, jetties, etc. It is also stipulated that the new board has the right to replace private anchorage by public anchorage. The board has also the right to buy necessary land and sell the land reclaimed. The value of the land to be appropriated will be decided by a commission of three persons—one nominated by taotai and customs commissioner, one by the consul who represents the nationality of the land owner, and one by the senior consul; and when the consul who represents the land-owner's nationality is senior consul the second oldest consul will nominate the third commissioner.

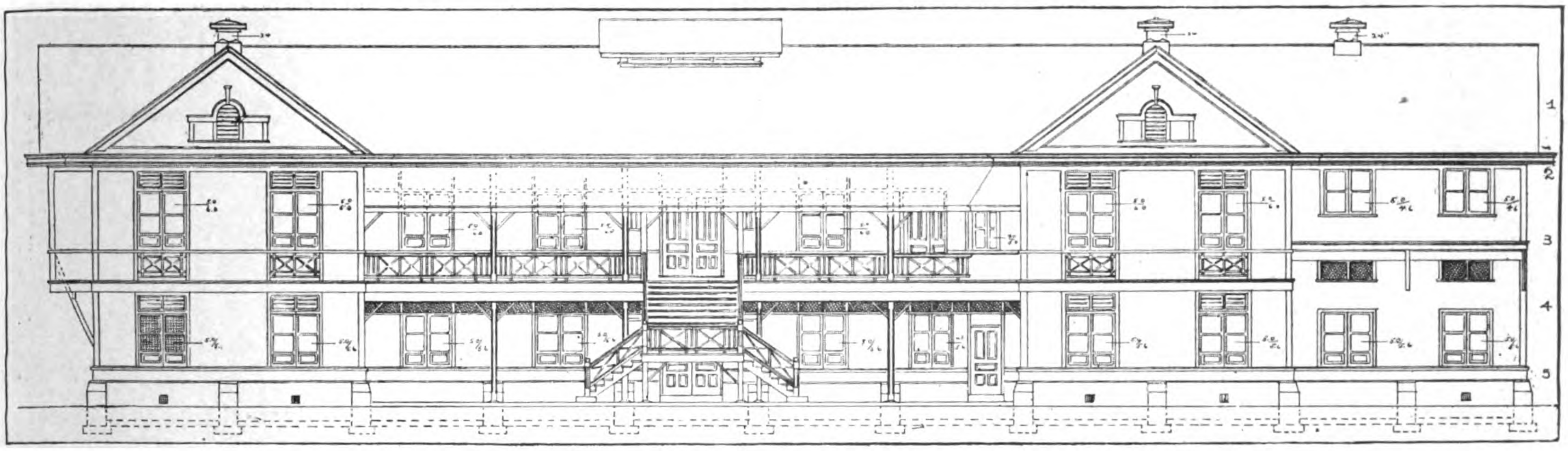
The improvement work will be commenced 3 mos. after the signing of the agreement—September 27th—and the engineers may be appointed and dismissed by the board, but the approval of a majority of the diplomatic body is made necessary. The consular body in Shanghai has the right to propose to dismiss engineers if it thinks the engineers unfit for the work.

The conservancy board must report upon the works and expenses thereof to the consular body every 3 mos.


MAP
OF
FORT WILLIAM McKINLEY
RIZAL PROV. P.I.
PREPARED IN THE OFFICE OF
WILLIAM E. HORTON.
CAPTAIN AND QUARTERMASTER U.S.A.
CONSTRUCTING QUARTERMASTER
PHILIPPINES DIVISION
N
P A S I G R I V E R
BOUNDARY LINE OF RESERVATION
MEDICAL OFFICERS QUARTERS
POST HOSPITAL
INFANTRY BARRACKS
CLASS OF BUILDINGS

CONSTRUCTION OF FORT WILLIAM M'KINLEY, MANILA, P. I.

(Captain WILLIAM E. HORTON, U. S. Army, Constructing Quartermaster; Mr. HARRY ALLYN, Supervising Architect.)



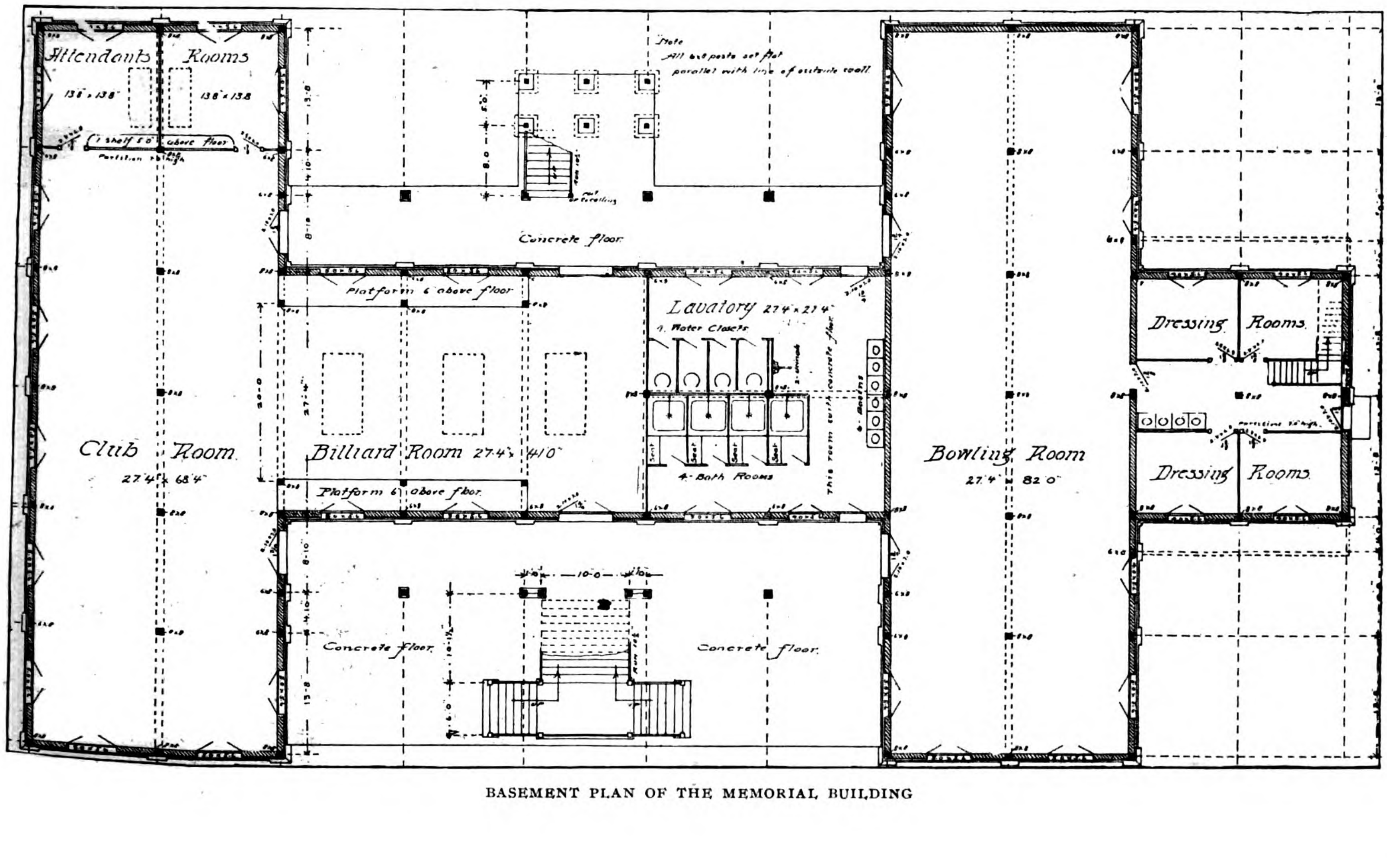
FRONT ELEVATION OF THE MEMORIAL BUILDING, CONSTRUCTED BY THE B. W. CADWALLADER COMPANY, MANILA

After unusual activity, which began when Major-General H. C. Corbin, A. G., assumed command of the Philippines Division, the great military reservation, known as Fort Williaam McKinley, is now being permanently occupied by troops of the United States Army. The cantonment is located about 6 m. SE. of the city of Manila, in the province of Rizal, and has an area of 1800 acres. It has been constructed to accommodate a command of 5,000, and while its acreage is not greater than that of Fort Riley, in the United States, its housing facilities are larger. Next to the famous British rendezvous for volunteers at Aldershot, it is the largest military cantonment in the world. It heads the list of great military reservations which accommodate troops continuously, and in the matter of modern facilities, buildings, etc., it is said to be far and away the greatest of all reservations of this character.

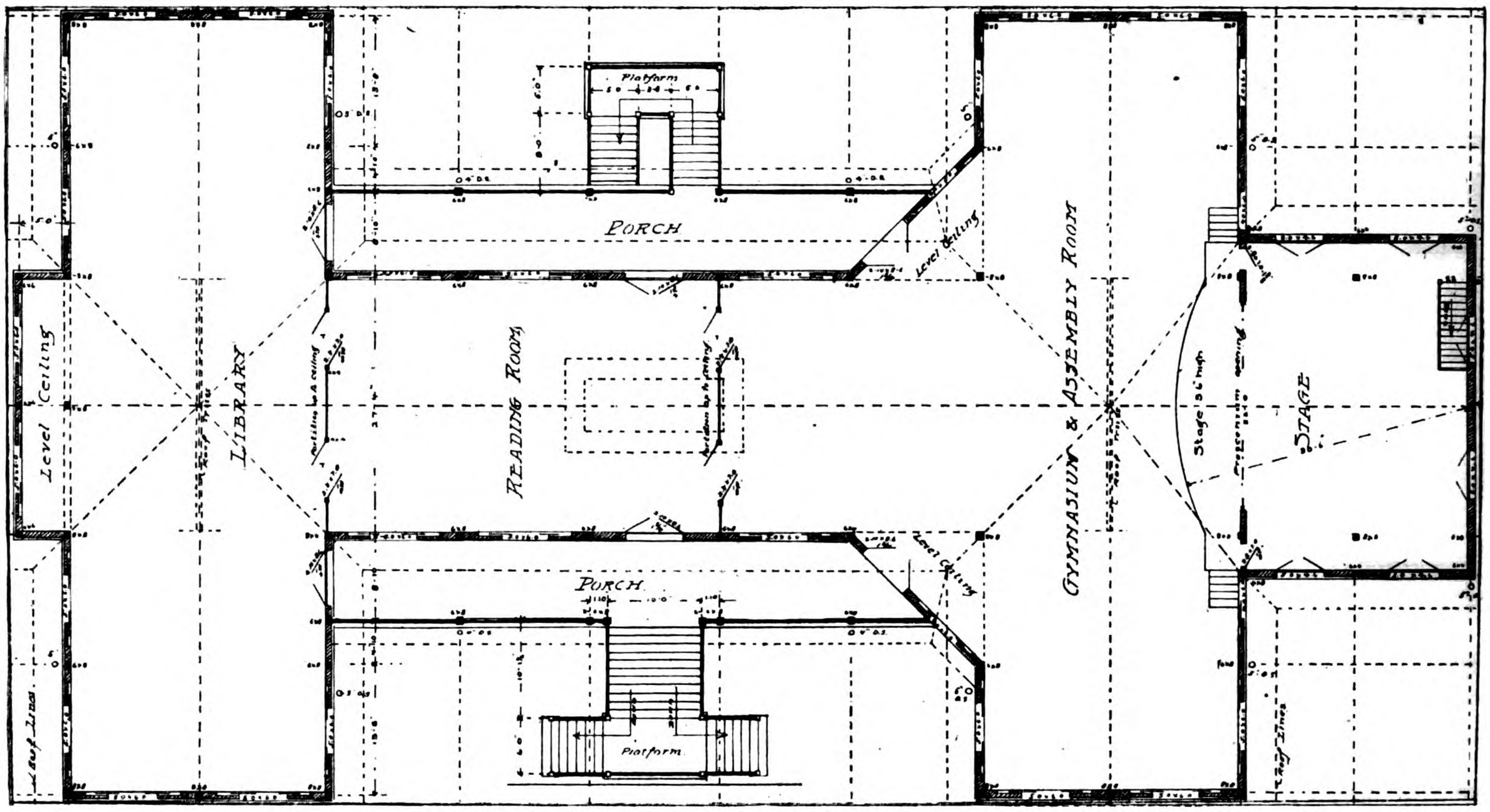
The construction of the buildings was commenced under the administration of Brigadier-General (then Colonel) Humphrey, Quartermaster-General, U. S Army, while he was Chief Quartermaster of the Philippines Division, and when he relinquished his post here Colonel John L. Clem, the present Chief Quartermaster, assumed highest supervisory control. Colonel Clem's interest in the progress of the work has been noteworthy, and with the valuable cooperation of Major-General Corbin he is permitted to see the reservation develop into a permanent post before the close of his administration, a bit of military history which is to be envied.

The land which Fort William McKinley occupies was formerly part of La Hacienda Maricaban, and was purchased by the United States Government in the early part of 1902, at a cost of $64,675 gold. It is situated on the right bank of the Pasig River overlooking the Laguna de Bay, and affords a most entrancing view of these two waters, the surrounding country, and in the distance the mountains of the Provinces of Rizal and Batangas. The land is high and dry, the system of sanitation complete and adequate; altogether, it is considered one of the healthiest spots in the whole archipelago.

BUILDINGS ON THE CANTONMENT.—The buildings on the reservation are designed after no particular style of architecture, but are planned for the comfort and physical well-being of the troops, and to meet the climatic and other con-



BASEMENT PLAN OF THE MEMORIAL BUILDING



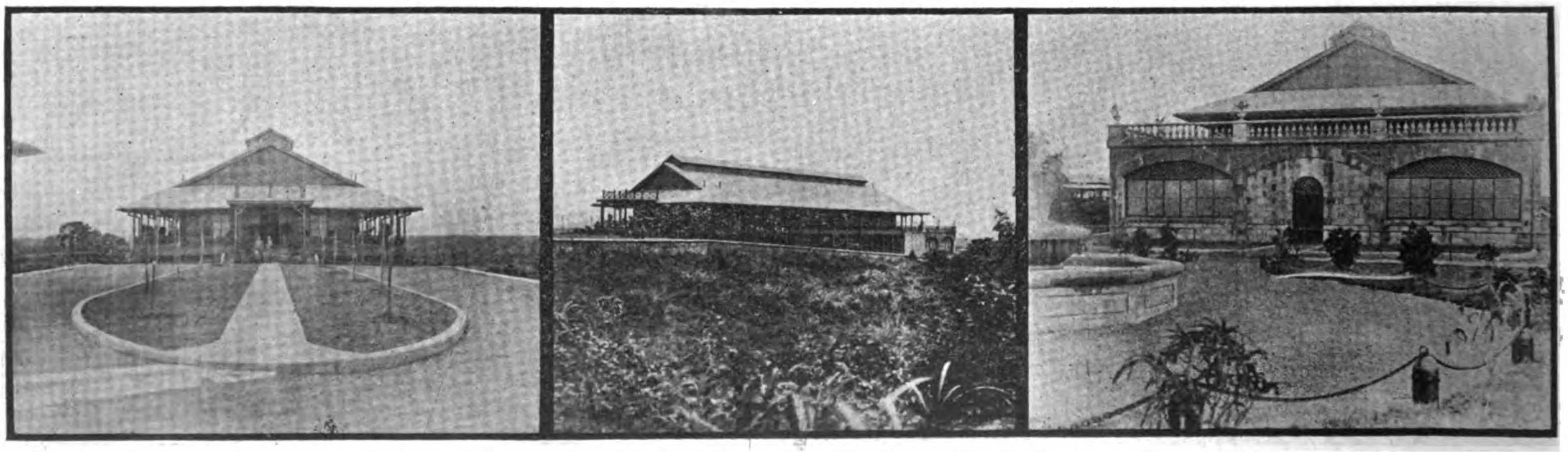
MAIN FLOOR PLAN OF THE MEMORIAL BUILDING.

ditions prevailing in these tropical Islands. The total number of buildings is 198, and their kind, number, and capacity are as follows:

KIND OF BUILDING.	NO. CON'TED.	CAPACITY.
Barracks, civilian employees	1	40 men
Barracks, band	3	40 men
Barracks, field artillery	2	120 men
Non-commissioned staff quarters	1	5 non-commissioned officers
Temporary nipa stables	1	100 animals
Temporary bunk houses	2	civilian employees
Temporary mess-house and kitchen	1	
Administration buildings	3	1 regimental headquarters
Guard houses	4	
Bakeries	1	
Field artillery stables	2	120 animals
Building for ice plant	1	
Building for pumping plant	1	
Gun sheds	2	6 guns and caissons
Post exchange and postoffice	1	
Brigade headquarters	1	1 brigade headquarters
Wagon sheds	6	25 wagons
Storehouses	8	
Double storehouses	2	

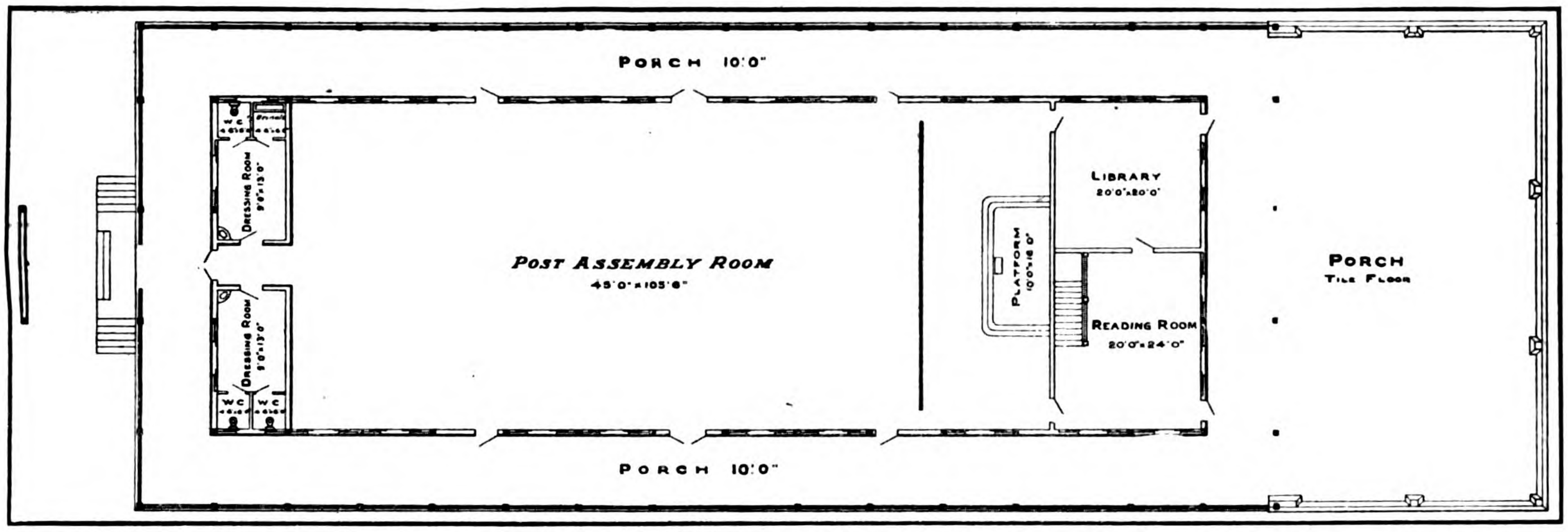
PANORAMIC VIEW OF FORT WILLIAM M'K

Barracks, infantry or cavalry	32	80 men
Commanding officer's quarters	3	1 colonel
Field officer's quarters	11	1 field officer
Captain's quarters	35	1 captain
Lieutenant's quarters	33	1 lieutenant
Bachelor officers' quarters	6	8 bachelor officers
Non-commissioned staff quarters	7	2 non-commissioned officers
Wheelwright and carpenter shop	1	
Blacksmith and plumbing shop	1	
Quartermaster and subsistence storehouse	1	
Hospital administration building	1	
Oil house	1	
Hospital pavilion wards	4	40 beds
Cavalry stables	8	70 animals
Brigadier-general's quarters	1	1 Brig. General
Stables, Quartermaster	2	100 animals
Memorial building	1	
Corral-master's office	1	
Pile and timber wharves	2	
Hospital operating ward	1	
Morgue	1	



POST ASSEMBLY BUILDING, DESIGNED BY MR. HARRY ALLYN AND CONSTRUCTED BY MR. O. F. CAMPBELL, MANILA

Front View. Side View. Rear View.



FLOOR PLAN OF THE POST ASSEMBLY BUILDING

Post Assembly building	1
Powder magazine	1

RAPID PROGRESS OF CONSTRUCTION.—When Captain William E. Horton, Q. M. *aide-de-camp*

COMMANDING GENERAL'S QUARTERS WITH AIDES' QUARTERS ON EITHER SIDE

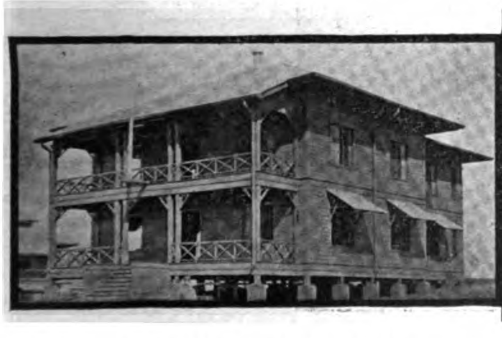
to General Corbin, was detailed as constructing quartermaster, December 19th, 1904, only twenty-eight buildings had been completed. On

…OGRAPHED FROM TOP OF THE WATER TOWER

September 17th, 1905, one contract was completed—that of S. C. Choy—and this made a total of 170 buildings constructed from December 19th, 1904, to September 19th, 1905. During the months of January, February, and March, 1905, the number of workmen employed on the construction was respectively 4,000, 5,000 and 6,000. And from 1902 to June 30th, 1905, the sum of $988,817.45 gold was spent at Manila, P. I., for roads, walks, bridges, culverts, transportation, wharves, freight from the United States, lighterage and stevedoring at Manila, temporary buildings, permanent buildings, artesian wells, office supplies and payrolls, clearing and grading sewer system, pumping-plant, tank, and trestle, water system, refrigerating plant shooting ranges, flag-staff and purchase of land.

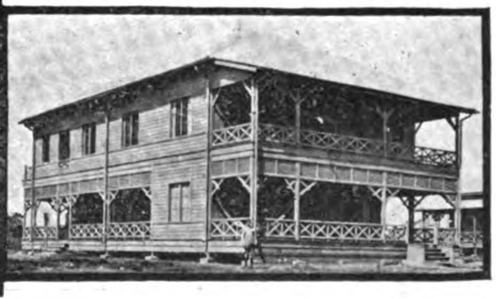
SOME NOTEWORTHY BUILDINGS.—Among the largest and most beautiful of the numerous buildings on the reservation are the Memorial building, Post Assembly building, Commanding General's quarters, brigade headquarters, post exchange, and postoffice, and the hospital and its pavillion and operating wards.

The Memorial building was constructed from funds donated by the Daughters of the American Revolution, at a cost of $10,000 gold, and is for the use of the enlisted men of the command as an amusement hall. It contains a billiard room, gymnasium, bowling alleys, and library, together with a large, well-equipped amusement hall. A study of the plans of this building, which are presented in connection with this article, will show that the enlisted man of the American army is never forgotten nor neglected, no matter if he be 8,000 miles from the homeland, by the good people under whose flag he serves. The Memorial building was constructed by The B. W. Cadwallader Company, of Manila, contractors, and in every detail with respect to arrangement, material, and accessories, it is a magnificent structure. The B. W



ADMINISTRATION BUILDING

QUARTERS FOR A COLONEL



BATCHELOR OFFICERS' QUARTERS

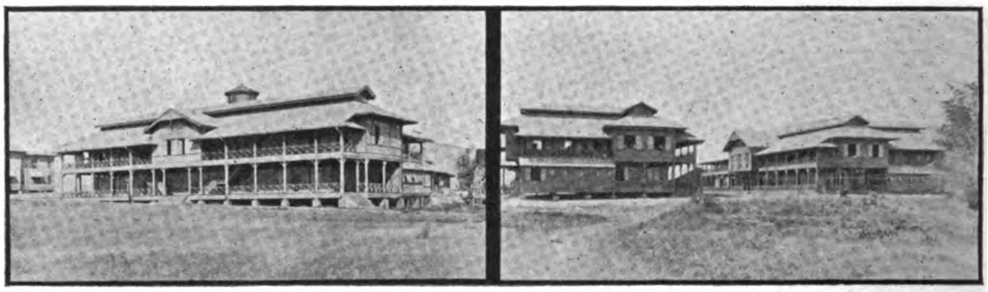
QUARTERS FOR A CAPTAIN

QUARTERS FOR A LIEUTENANT

Cadwallader Company also built the commanding general's quarters, three captains' quarters, and the artillery and cavalry stables. All of these structures show the master hand in construction and are considered a great credit to the company whose work is always of the highest order.

The Post Assembly building—by far the prettiest structure on the reservation—was designed by Mr. Harry Allyn, the supervising architect and superintendent of construction, and was built by Mr. O. F. Campbell, of Manila, general contractor. This building is located on a promontory overlooking the Pasig River and the Laguna de Bay, and affords a most beautiful view of the enchanting surrounding country. The dimensions of the building over all are 65 ft. by 192 ft. The main assemb lyhall is 45 ft. by 105 ft. On this floor are two dressing rooms in front and two large rooms in the rear, the latter intended for reading and library purposes. In the rear is a large tile porch 44 ft. by 64 ft., and under this end of the building are six rooms intended for club purposes. Extending beyond the rear of the building is a small park containing a fountain. The entire structure is surrounded by a porch 12 ft. wide. The main assembly hall is to be devoted to post gatherings such as lectures, church services, receptions officers' school, etc. The reception to the Secretary of War, Miss Alice Roosevelt, and the congressional party that accompanied Mr. Taft to the Islands, when the latter inspected the post, August 9th, was held in this room. Besides this structure, which, from the standpoint of architectural beauty and thorough construction, is a gem, Mr. Campbell has constructed four hospital pavilions, one brigade headquarters, and eight of the large barracks buildings, all of which show the same thorough workmanship and solidity which characterizes the assembly building.

ROADS, SIDEWALKS, AND CURBING.—Ten miles of macadam road have been constructed at the post, and cement sidewalks and curbing have been put in front of all quarters. The stone for the construction of roads was obtained for the most part from Malahi Island, but during the month of June, 1905, the rock gave out and it became necessary to obtain this material by purchase in the open market. In June 25,000 cub. yds. of broken stone were contracted for with the following contractors: N. T. Hashim & Co., 15,000 cub. yds., at ₱2.39 per cub. yd.; Faustino Lichauco, 5,000 cub. yds., at ₱2.50 per cub. yd.; Ramos Pazos, 5,000 cub. yds., at ₱1.94 per cub. yd. All of the rock is a No. 1 quality of Binangonan grade. The roads, sidewalks, etc., were built by The B. W Cadwallader Company.



TYPES OF BARRACKS FOR ENLISTED MEN

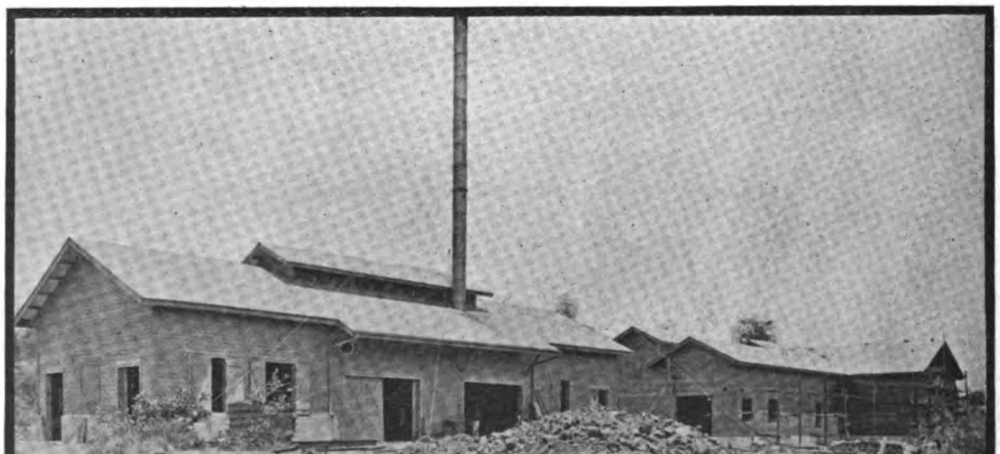
POST HOSPITAL BUILT ON THE PAVILION PLAN

WATERWORKS.—Work in the water system was begun in December, 1904, and finished in July, 1905. Water is obtained from two artesian wells on the reservation, which were drilled by John G. Sutton, of San Francisco, Cal., and is pumped into a 100,000 gal. tank, which was erected by Messrs. Dyer Bros., of San Francisco, Cal. The distributing system of the water supply consists of 2,800 ft. of 10-in. pipe, 35,000 ft. of 6-in. pipe, and 7,200 ft. of 4-in. pipe. There are fifty-eight 6-in. fire hydrants, ten 4-in. hydrants, and one water crane, the latter being placed so that at least two streams can be thrown on every valuable building on the cantonment. This water system was constructed by day labor under the direction of Lieutenant J. H. Poole, C. E., U. S. Army

SEWER SYSTEM.—Contract for the laying of a complete sewer system was entered into with Messrs. Grant & Co., Ltd., of Manila, May 27th, 1904, and the work finished by this firm April 19th, 1905, at a total cost of $40,000 gold. In the construction of this system 53,163.51 ft. of trenches were opened, 52,542.17 ft. of pipe laid, and 201 manholes constructed. Excavation, including back-fill, amounted to 18,156.80 cub. yds. This work was superintended by Lieutenant Thomas H. Jackson, C. E., U. S. Army.

REFRIGERATING PLANT.—A 15-ton Frick refrigerating plant was installed during the first part of the current year, and is giving perfect satisfaction.

MATERIALS USED IN CONSTRUCTION.—Oregon fir, with the exception of posts, which are of native hardwood, was used in all the work at Fort McKinley. In this connection, Captain Horton, the constructing quartermaster, has recommended that all woodwork on the inside of all buildings, constructed by the military in this country, be oiled. This as a preservative measure, as well as for appearances. He also recommends that the posts of all buildings be



POST WATERWORKS AND REFRIGERATING PLANT

painted with carbolineum in order to resist the attacks of white ants, and that the posts of the buildings be inspected regularly to see if any damage has been done to them.

Six thousand bbls. of "Green Island" cement, manufactured in Hongkong by the Green Island Cement Company, Ltd., Messrs. Shewan, Tomes & Co., general managers, have been used on the reservation from January 1st to June 30th, 1905, and as to quality and test it has met every requirement. Messrs. Wm. H. Anderson & Co., Manila agents for this cement in the Philippines, secured the contract for the supply of this material.

FLAG POLE.—A 100-ft. steel flag pole has been erected in front of post headquarters.

CAPTAIN HORTON'S ASSISTANTS.—During Captain Horton's detail at Fort McKinley as constructing quartermaster, he has been assisted by Captain J. R. R. Hannay, 22d U. S. Infantry, who is in charge of all work being done by day labor; 1st Lieutenant E. W. Terry, 7th Infantry, with Captain Hannay; 1st Lieutenant J. H. Poole, C. E., in charge of water supply, plumbing, and grading; 1st Lieutenant Thomas H. Jackson, C. E., in charge of sewers and construction of roads, bridges, walks, and culverts; Mr. Harry Allyn, who has ably supervised the architectural end of the construction, with Mr. F. D. Baker as chief clerk in the constructing quartermaster's office.

There is little to say of these gentlemen individually, and the work they have accomplished, that can not be said of them all. Under the able supervision of Captain Horton his efficient staff has labored relentlessly and faithfully in the interest of the United States Government, and while as a result of their skill Fort McKinley has developed into a most modern and magnificent military post—a fitting tribute to the memory of the martyred President for whom it has been named—the whole undertaking is bound to redound to the credit of all of them.

MAGNETIC SURVEY OF THE PACIFIC

A magnetic survey of the North Pacific Ocean has been inaugurated by the Department of International Research in Terrestrial Magnetism of the Carnegie Institution at Washington, U. S. A. A wooden ship, the brig *Galilee*, which was fully adapted for the purposes of the expedition at San Francisco, has sailed from that port on her first season's work.

The object of the expedition is to secure precise data of the distribution of the magnetic forces over the Pacific Ocean. Except for data from occasional expeditions and such as were required in wooden vessels a long time ago, the present magnetic charts used by the navigator over this region depend largely upon the observations on islands and along the coasts. Such land observations, however, are rarely representative of the true values, because of prevalent local disturbances. It is, therefore, impossible to make any statement as to the correctness of the present charts.

An initial allotment of $20,000 has been made to cover the expenses of the current year. It is estimated that the work can be accomplished in 3 years. The first cruise will be from San Francisco to San Diago, Honolulu, and back to San Francisco. It is then proposed to make a circuit from the W. of America to the Galapagos Islands, thence across the Pacific to the Philippine Islands and Japan, returning by way of the islands, closing the circuit at San Francisco, and thence continuing through a series of areas bounded by parallels of latitude and meridians of longitude each 5 deg. apart, lying next on the midocean side of the circuit last made, and proceeding gradually and by successive circuits into the central region of the North Pacific.

The total length of the course marked out is about 70,000 knots. The cost per month of the field work, inclusive of all expenses and services, will approximate $1,500. Counting 8 mos. of continuous service *per annum*, the total annual outlay is estimated at about $12,000.

The director of the work is Dr. L. A Bauer, who is likewise in charge of the magnetic work of the United States Coast and Geodetic Survey.

The *Galilee* carries a crew of nine men and a sailing master. The scientific leader and commander of the vessel is J. F. Pratt of the United States Coast and Geodetic Survey, who has had 30 yrs.' experience in astronomical, geodetic, hydrographic and magnetic work. The members of the scientific corps are Dr. J. Hobart Egbert, magnetic observer, surgeon and naturalist; J. P. Ault, magnetic observer, and V. W. Whitney, magnetic observer, and watch officer.

WOODWORKING MACHINERY FOR JAPAN

Mr. Stafford Ransome, M. I. C. E., author of "Japan in Transition," points out that woodworking machinery is bound to be in great demand in Japan when normal economic conditions are restored after the war.

Engineering firms in all branches of trade will profit by the new condition of things, says Mr. Ransome, but the sawmill engineer most of all. And this is the reason: While for years past makers of engines and boilers, and machine tools, and dockyard and railway plant, and a hundred other things have plied a large trade in Japan, the question of woodworking machinery is only in its infancy in Japan. Some sawmill engineers may well question that statement, for they can refer back to their order books, and say with perfect truth that for a long time past they have been carrying on a large and successful business with that country. And so they have, but that trade is as nothing as compared with what must come, for the one great woodworking industry of the country which, of itself, is ten times larger than all the rest combined, has not yet been tapped.

Heretofore most of the woodworking machinery supplied to Japan has gone to the government. There have been railway car and wagon machines, machines for use in dockyards and arsenals. Besides the government orders there have been orders of a kindred nature from private users and companies, and occasionally there have been box-making, and other independent factories. In an experimental way, too, small log sawmills have been started. But when all is said and done these machines supplied up to the present have not been used for the purpose of house construction. When it is considered that there are 40,000,000 Japanese, and that all of them are housed in wooden structures, that these structures are all made up of carefully prepared and accurately-joined timbers, and, above all, that the dimensions and styles of the timber employed are all laid down on accurate and uniform lines, the scope of the sawmill engineer, when once he has tapped this market, may be realized.

When Japan erected a railway or a dockyard plant she adopted woodworking machinery because that was a part of that plant. She was running the whole thing from beginning to end on Western lines, and she carried out the principle, as she always does, to its logical end. Then again, when she began to compete with other countries in making tea boxes for India, she soon came to the sound conclusion that she had better adopt the same means of making these boxes and so she put down box-making machinery. But the case of timber construction for domestic purposes was entirely different. She had her own methods of making these things, and there was nothing in her domestic architecture that had been borrowed from the foreigner. She used, and she still uses, and there is no reason why she should not always use her own native timber for this purpose, for there is an abundance of it. And it is because of the abundance of skilled labor at a low price in an industry that has nothing of the foreign element in it, and that has been a characteristic native industry from time immemorial, that the maker of woodworking machinery has up to the present time been unable to push his way into it.

These, therefore, are the points that Mr. Ransome would impress upon manufacturers of woodworking machinery. First and foremost the time has come for studying the nature of the construction of the Japanese house. The machinery for making it can be standardized in a manner impossible with any other class of building. Throughout the timbers can be sawn, and adzed, or mortised, and bored, and planed by machines working as simply, rapidly, and automatically as those which prepare railway ties of special types of boxes. For the "repetition" work is enormous, and the demand will be almost the biggest thing in woodworking machinery that has been known in the way of a "new line." The scarcity of labor brought about by the war and the outflow of the artisan class will shortly make the introduction of machine-made houses a necessity, and it is the firm that will make the best set of specially designed machines for the purpose that will secure the trade. The ordinary saw bench, and planer, and mortising and tenoning machines will do the work, but something far better than the usual tools can be easily designed for this special work.

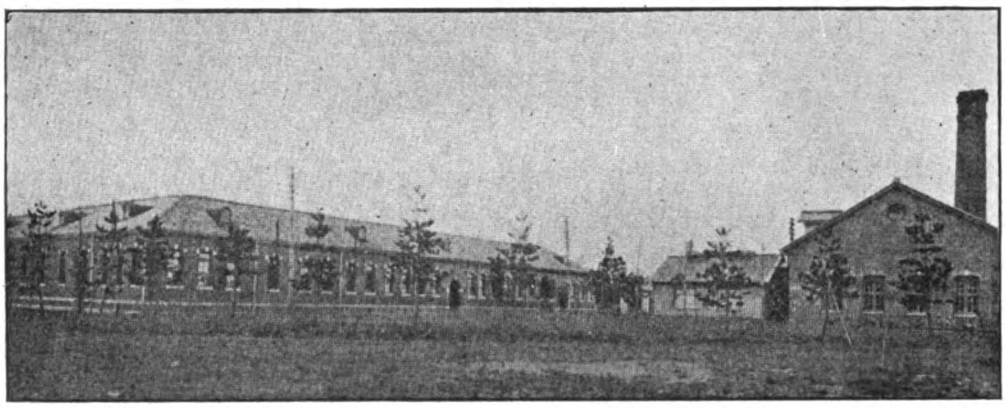
STEAM TURBINES FOR JAPAN

With the industrial awakening of Japan, according to electrical and engineering papers published in America, has come a need for electrical power not only for manufacturing purposes, but for transorptation and lighting. Japanese engineers are wide-awake, and their enterprise is nowhere more clearly indicated than in their adoption of steam-turbine electric-generating units. The first shipment of steam turbines arrived in Japan *via* the Steamship *Korea* recently from San Francisco. They were 500 kw. capacity of the Curtis type, and were for operating the Shigai Railway in Tokyo. Four weeks from their arrival they were in full operation. As significant of the success of these first units there have been ordered by the Japanese from the General Electric Company of New York, thirty-seven Curtis steam turbines with electric generators with a total normal capacity of more than 35,000 h. p. Of these, eleven units are now installed and in satisfactory operation.

The Japanese are not slow in adopting the electrical systems which will improve their manufacturing and transportation facilities and give the people better lighting service. They are using electricity for operating the street railways of their cities and for indoor and street lighting. In the use of electric power for machine shops, they are following only the best American practice, which, as a rule, requires electric motors mounted on each tool. The coal mines of Japan will eventually be operated electrically. Some of the turbines mentioned above are intended for the Miike coal mines on the Island of Kyushu. These are owned by Mitsui & Co., and will use two 100 kw. Curtis steam turbines.

The Osaka Electric Light Company, which furnishes electricity to the City of Osaka, which has a population of over 800,000, is equipped entirely with American electrical apparatus, including six steam turbines of the same make. One of the largest electrical interests in Japan which has ordered some of the machinery referred to above, is the Tokyo Street Railway Company, which furnishes transportation facilities for the City of Tokyo, which has a population of 1,440,00. Its franchise runs till 1952. Apparently, the municipal ownership idea has obtained some weight, for this franchise provides that after the year 1932 the municipality may purchase the property of the company by paying a proper price for it. Although some English and German material is being used by this company, practically all the electrical equipment is American made. This includes five 2,000 h. p. Curtis turbo-generator units, with powerhouse equipment and railway motors furnished by the General Electric Company, Wheeler condensers and Brill trucks. Besides a small amount of German and English machinery, such as boilers and trucks, there are a few small dynamos which were made in Japan.

ELECTRIC ENGINEERING COURSE AT IMPERIAL UNIVERSITY OF KYOTO, JAPAN



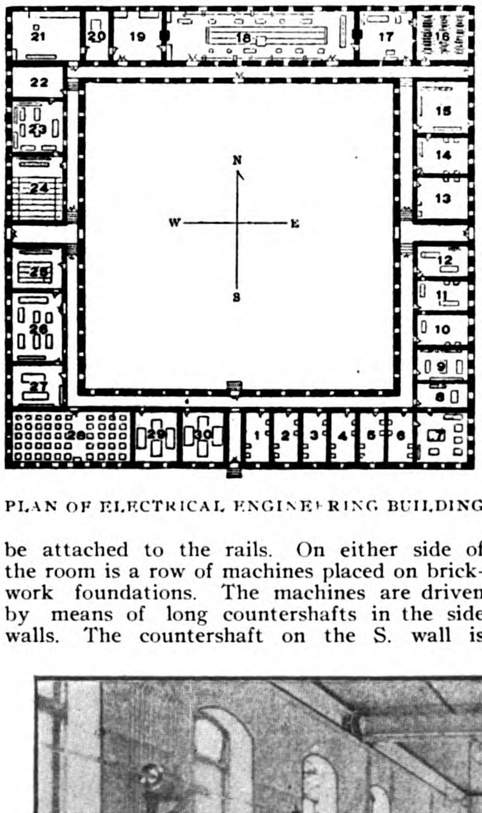
ELECTRICAL ENGINEERING BUILDING, BATTERY ROOMS AND POWERHOUSE

The second great educational institution of Japan, the Imperial University of Kyoto, is of comparatively recent construction, having been founded after the close of the war with China by an allotment of funds from the indemnity received from China. From the beginning electrical engineering took a prominent place in the curriculum under the able administration of Professor Masashi Namba, head of that department, a pupil of Mascart, in whose laboratory in the College de France he was for a time an assistant. When the course at Kyoto was first started Professor Namba gathered a large collection of electrical engineering material and fittings, donated principally by American manufacturers, with the object of illustrating lectures on practical subjects by specimens of the material, fittings, etc., referred to. He also proceeded to the building up of a general laboratory, which now in up-to-date equipment for the training of students in electrical engineering ranks favorably with the best of its kind in the world.

The main building occupied by the Department of Electrical Engineering was designed with special reference to the use to which it would be put. Among the prime requisites for an engineering laboratory may be noted adequate light and freedom from disturbances of delicate instruments. The building is a substantial brick structure one story in height. It has a frontage of 158.45 ft. and a depth of 198 ft., with an inner court 135.45 by 135 ft. The electrical laboratories are so arranged in the building that the heavy currents in the engineering laboratory are so far separated from the instruments in the more purely physical laboratory that practically no detrimental effect is produced upon the latter by the magnetism of the former.

A plain view of the building is given in the accompanying floor plan, in which the various rooms are referred to in numerals. In the S. side there are three standardizing rooms, 29 and 30, and a well-lighted drawing room, 28. The remaining rooms in this side of the building, 1-6, are used for delicate instruments, while the corner room, 7, is the professor's office. In the N. side, the W. corner rooms, 20 and 21, are workshops, the E. corner contains a storage battery room, 16, and a high-tension testing room, 17, while in the middle part is located the laboratory for heavy-current engineering, 18, and an electrochemical laboratory, 19. In the E. side there are an office, 8, a library, 9, a photometer room, 15, and five research laboratories, 10-14. The W. side contains two storerooms, 22 and 23, two lecture rooms, 24 and 25, a museum, 26, and a special laboratory, 27. The building is equipped throughout with electric lamps, electric heaters and telephones.

The room used as a laboratory for the testing of dynamos and meters, 18, is 82.5 ft. long, 24 ft. wide and 17 ft. high. Special provision has been made for facilitating the arranging of electric apparatus as desired anywhere in the room. A 3-ton, hand-operated traveling crane serves for moving the heavy machinery. Four lines of rails of U-shaped section, which are spaced uniformly at 2 ft. apart in the concrete floor, are used for holding the machines in place. Each machine is mounted on a wooden frame of a special type, so that it may readily



PLAN OF ELECTRICAL ENGINEERING BUILDING

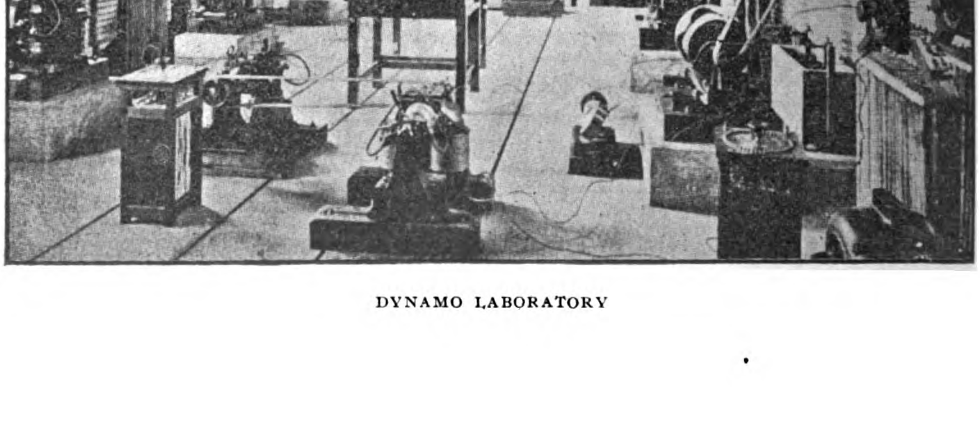
be attached to the rails. On either side of the room is a row of machines placed on brickwork foundations. The machines are driven by means of long countershafts in the side walls. The countershaft on the S. wall is driven through a belt by a 5 h. p., 100-volt, Edison bipolar motor, while the one on the N. wall is driven by a 10 h. p., 440-volt, A. E. G. direct-current motor, or by a 9 kw Schuckert rotary converter used as a direct-current motor. The machines on the brick foundations can be driven not only by the counter shafts, but by the motors temporarily fixed on the rails. The portable machines can be located at any desired place and operated as generators or motors, according to the needs of the students.

In addition to the two motors specifically referred to above, the dynamo and motor laboratory contains a 1-lamp Brush arc machine, a 2 h. p. Stanley, 2-phase, 60-cycle motor, a 1 h. p. Westinghouse 3-phase induction motor, a 9 kw Schuckert 1-2-3-phase rotary converter, a 2 h. p. Schuckert direct-current, series-wound motor, a 1 h. p. Shibaura (Japan) 3-phase induction motor, a 2 h. p. Wagner single-phase motor, a 1 h. p. Shibaura single-phase rotary converter, a Shuckert motor-generator set, the two machines being connected by a flexible leather coupling, the field cores of each machine being provided with both series and shunts coils. There are also a 3 h. p. Osaka (Japan) 3-phase induction motor, two 2 kw, 110-volt, direct-current generators, a 1 h. p. Westinghouse, direct-current, compound-wound motor.

Direct current is obtained from the switchboard at 20,110,220,440 or 500 volts. Switchboards are equipped for applying alternating currents as obtained from the Schuckert and Shibaura rotary converters operated inverted, or from a 50 kw, 1000-volt Westinghouse 3-phase generator, which is installed in the central power-house.

The central power-house serves not only to supply electricity to all parts of the university, but to give to the third-year students practice as engineers, and to afford opportunities for original investigation in engineering subjects. In addition to the Westinghouse alternator just referred to, the machines especially equipped for laboratory purposes are as follows: A 12.5 kw, 125-volt, General Electric, direct-current generator and two 5.4 kw, 500-volt, 50-cycle, Schuckert, 3-phase alternators. One of these latter alternators is direct-connected to a 440-volt, Westinghouse, direct-current motor, while the other is belted to a 10 h. p. De Laval steam turbine.

The high-tension test room is equipped with the following apparatus: Four 7.5 kw, 100 to 10,000-volt Stanley transformers; a 5 kw Westinghouse rotary converter, which transforms from 60-80 volts alternating current to 100-140-volts direct current; a transformer having a ratio of 1,000 to 60-80 volts for the

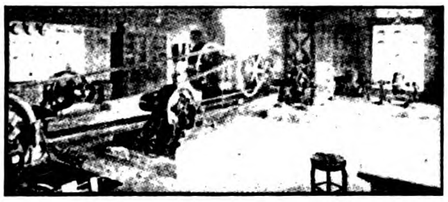


DYNAMO LABORATORY

rotary converter, and a 1 h. p., 200-volt Westinghouse induction motor.

In the N. side of the electrical engineering building are located a well-equipped electrochemical laboratory and a photometer room. The latter room is divided into many compartments by black cloths hung from the ceiling, the floor and the inside of the walls being also blackened. There are installed photometers of the Weber, Rousseau and the Lummer-Brodhun types, with many kinds of photometric standards and numerous styles of X-ray apparatus. Among the various new lamps in use may be mentioned the Nernst lamp, the Cooper Hewitt mercury vapor lamp, an arc lamp with impregnated carbons and a singing arc.

In the center of the yard, which is surrounded by the electrical engineering building, is erected a 140-ft. pole made of iron pipe. This pole is used principally for experiments in wireless telegraphy There is provided a special laboratory for containing the wireless telegraphy apparatus, most of which is of the Lodge and Popoff-Ducretet systems.



INTERIOR OF POWERHOUSE.

In two rooms set apart from the standardizing laboratory extra care was taken to eliminate the effects of external disturbances upon the delicate apparatus there installed. To prevent vibrations each instrument is placed upon a granite plate laid on a brickwork base. The important measuring instruments in the direct-current room are a potentiometer, standard resistances, Clark standard cells, adjustable resistances, storage batteries, etc., while in the alternating-current room are to be found two Kelvin standard balances, Weston direct and alternating-current wattmeters, voltmeters and ammeters, standards of capacity and self-induction, a Rowland electrodynamometer, a Weber electrodynamometer, etc.

There are two lecture rooms, seating 50 and 70 students, respectively. The latter is equipped with two independent supply circuits from the main switchboard of the laboratory, so that both direct and alternating current can be used for purposes of demonstration when desired.

In the library of the department is a large collection of books on physical, electrochemical and engineering subjects, most of them being written in English, German and French. The principal periodicals are received regularly while all of the new publications of importance are obtained as soon as issued.

HIGH-TENSION TESTING ROOM.

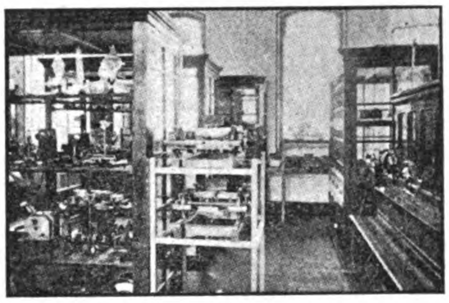
The museum of the electrical engineering department contains a large collection of instruments, apparatus and samples of materials relating to telephony, telegraphy, electric power, electric light, electric traction and electric heating. Among the collection may be found a 240-drop telephone switch-board, a selenium photophone, a Zickler photo-electric signaling device, a Franke contact-maker, an A. E. G. phase adjuster, four models of Brill trucks, an electric furnace, frequency meters, galvanometers, samples of cables, conduits, etc.

The principal distributing circuits consist of a 2x220-volt direct-current, three-wire system used in parallel with a storage battery controlled by the end-cell method. There are two battery equipments, the larger one of which contains 188 Tudor cells, 100 having a capacity of 3 x 42 ampere-hours and 88 used as end cells having a capacity of 3 x 60 ampere-hours. The smaller equipment consists of 60 Tudor cells of 3 x 36 ampere-hours capacity and 60 E. P. S. cells of the same capacity. This latter battery is equipped with an automatic end-cell sichtst by means of which the pressure is kept conwant at 110 volts. The switchboard in the main power house is so designed that the three direct-current generators installed there may be connected in series or parallel or joined with the storage batteries in any manner desired for particular cases.

The boiler room contains a 100-h. p. Heine water-tube boiler and a 50 h. p. Sterling boiler of the same type. The latter boiler is equipped with an under-feed stoker and a blower driven by a 1-h. p. 440-volt, direct-current motor. Two motor-driven feed pumps of 0.5 h. p. and 0.75 h. p. capacity, respectively, are located in one corner of the room, and in the opposite corner there is a feed-water heater.

There are in use around the university more than 1,000 220-volt incandescent lamps, 11 arc lamps and about 20 h. p. capacity in motors for various purposes.

The teaching staff of Prof. Namba consists of two assistant professors, four lecturers and three tutors. The students enrolled in 1904 numbered 59. The first class was graduated in 1900 and the total of graduates to 1904 is 30. The practical character of the instruction is denoted by the graduating theses, some of the subjects of which have been as follows:



ELECTRICAL ENGINEERING MUSEUM

Transformer regulation; design of an electric lighting plant; compensation of alternating-current line drop; alternator armature reaction; choice of magnetic induction in design of small transformers; design of Arima electric railway; a study of the Nernst lamp; analytical study of the induction motor; design of a small power plant; speed control of electric motors; extension of power plant of the Kyoto Electric Traction Company; study of Faure battery plates; the correction factors of wattmeters; surging between parallel-connected alternators; design of a transmission line; most economical transmission for the Miyake railway extension; iron as an alternating-current conductor.

BORNEO'S RAILWAY EXPERIMENT

According to a German gentleman who recently made a trip over the entire length of the Tenom Railway, from Jesselton to Fort Tenom, British North Borneo, a distance of about 120 m., the line is very primitive in construction and rolling stock. It is not yet in a state of completion, but a service of three trains a week is maintained with as near an approach to regularity as one can expect under the circumstances.

It appears that the main hindrance to traffic is the state of the bridge which spans the Papar River at Fort Papar, half way between Jesselton and Beaufort, which is about 80 m. from the coast. The bridge which was originally constructed foundered badly, and became incapable of sustaining the weight of a train. It has been patched up, however, to bear the weight of one truck at a time, while a newer and stronger bridge is being built. The delay thus caused may be imagined when it is stated that a train made up of, say, fifteen cars has to be pushed across the bridge one car at a time by coolies, for the structure cannot bear the additional weight of an engine. The running of trains is so arranged that an outgoing train and an incoming one meet at the bridge and having been pushed across they are coupled to the waiting engine on either end and then proceed on their journey.

Numerous stoppages are also caused by landslides from the sides of the mountains along the base of which the railway runs throughout a great part of its length. When such obstacles are encountered there is nothing for it but that all hands, from the all-important Eurasian engineer down to the passengers, lend their assistance to clear away the obstruction. These slides are generally not very heavy, but occasionally a big clip occurs, entailing several hours' delay. From Jesselton to Beaufort—80 m.—the time usually taken is about 12 h.; but, as before stated, about one-third of the time is taken up in the passage of the broken bridge at Fort Papar, and when the new bridge is completed and the trains can go right ahead, the journey will be correspondingly shortened. From Beaufort to Tenom, the terminus, the distance is some 40 m., which is done in from 4 to 5 h. The average speed thus comes to about 10 m. per h., which compares very favorably with some of the China railroads.

CENTRAL STATION ON FIRING LINE

Recently a passenger train on the Pennsylvania Railroad collided with a freight train at Harrisburg, Pa., U. S. A., causing the explosion of 50,000 lbs. of dynamite, contained in two of the freight cars. The tremendous force of the explosion, which shattered windows 3 m. from the wreck, inflicted little damage to the exterior of the power plant of the Paxtang Electric Company, designed and built by Messrs. J. G. White & Co., engineers and contractors, of New York, London, and Manila, constructors of the Manila electric railroad and lighting system. As a matter of fact, the substantial character of the building enabled it to withstand the shock, according to *The Electrical World and Engineer*, and continue in operation. Mr. Hamblin, general manager of the Paxtang Electric Company, shows a sub-station voltmeter chart on which is indicated the time of the explosion. This shows that no interruption of service was experienced, although 1,000 panes of glass were blown in, covering engines, generators, machinery and floor with finely broken glass. The explosion occurred only about 150 ft. from the power house, and a careful examination failed to locate a crack of any kind either in the stack or in the building, not even a brick of which was displaced.

TRADE CATALOGS

"The Cigar Question," Messrs. Walter E. Olsen & Co., Manila, P. I.

This is a handsomely illustrated catalog, printed in red and black, containing prices and other useful information relative to the leading brands of Manila cigars distributed by Messrs. Walter E. Olsen & Co., successors to Kiosko Habanero, importers, exporters, and jobbers of all kinds of cigars, cigarettes and tobaccos. The office addresses of this enterprising firm are 9 Plaza Moraga and 27 Escolta, Manila, P. I. The catalog is well worth careful perusal. It was printed by Messrs. E. C. McCullough & Co., Inc., Manila, P. I., and is one of the neatest trade publications that has come to our desk for some time.

"St. Raphael Wine," Messrs. Caldbeck, MacGregor & Co.

This enterprising firm, doing business at Singapore, Hongkong, Shanghai and Tientsin, in the Far East, has issued a pamphlet concerning St. Raphael wine, and other valuable information of interest to consumers of alcoholic liquors which should be of great help to retailers of these goods in making selections for their trade.

FAR EASTERN ENGINEERING AND CONSTRUCTION NEWS

PERSONAL

Mr. T. F. Carlisle, H. B M. consul at Hanoi, has entered upon his official duties. This is the first consulate in the metropolis of Tonkin.

Mr. Willis E Grev, late engineer-in-chief of the Canton-Hankow Railway Company, has entered a suit at Shanghai against the American China Development Company, claiming damages in the sum of $13 500 gold for breach of contract. This is the company that has just sold its rights to the Chinese Government for $7,000,000.

Mr David Kinlock Michie, an engineer of the Colombo Iron Works, and Mr. George Herbert Golledge, a planter of Gikiyanakande Estate, Nebotla, Ceylon, have been authorized to file at Penang, Straits Settlements, a specification of an invention for "improvements in the method of separating or coagulating india rubber, and its appliances therefor."

Mr. George E. Wade, a well-known sculptor, has been commissioned to mould the first public statue of Queen Alexandra. Its destination is Hongkong. The statue is to be erected out of a fund raised in connection with the celebration of the coronation in Hongkong. It will be life-size, of bronze, and will represent Her Majesty in her coronation robes.

Mr. Lorenz, an electrical expert representing the firm of Messrs. Arnhold, Karberg & Co , recently gave a demonstration at Lanchow, China, of the advantages and the working of the Marconi system of wireless telegraphy. Messages were sent from that place to Tientsin and received there by means of a balloon with a long, light wire tail, and connected with the apparatus by a wire line. It is understood that the Chinese Government intends to use the Marconi system of telegraphing at the forthcoming autumn manoeuvres at Paotingfu.

RAILWAYS, SUPPLIES, ETC.

SHANGHAI-NANKING LINE.—The construction work on the section of Chinkiang of the Shanghai-Nanking line has been commenced.

CIRCUM-BAIKAL RAILWAY.—It is reported that the new Circum-Baikal Railway has been totally destroyed. Russia has ceased the transportation of troops to Manchuria.

RAILWAY EXTENSION, JOHORE.—The railway extension from Johore Bahru to the frontier of Malacca is proceeding apace, and has now been constructed within two m. of Tampoi in Johore.

JAPANESE MANCHURIAN LIGHT RAILWAY.—This line, which starts from Antung-shien, is now said to have been completed as far as Motienling Pass. Another line to the Kirin region is being constructed with dispatch.

RAILWAY SURVEYS, F. M. S.—The following surveys for a system of light railways in Perak are being made: Tronoh to Ipoh, 13 m.; Tapah Road to Temoh, *via* Tapah and Chenderiang.

CANTON-KOWLOON RAILWAY.—The viceroy of Canton and the British consul are negotiating for the construction of this line. That portion of the road which leads through Chinese territory will be built by the Chinese Government.

CANTON-HANKOW RAILWAY.—Negotiations for handing over this line to China have been completed in Washington The Hanyang ironworks are employed night and day in the manufacture of iron rails and other railroad materials.

RAILWAY CONSTRUCTION, BURMA—Good progress is reported to have been made on the Pegu-Martaban line. Of earthwork about half has been done. Good progress is also reported on the Henzada-Kyangyin line. The earthwork is nearly completed.

RAILWAY CONTRACT, CHINA.—The Chinese Government has placed an order with a certain French firm for 5,000 rails, to be delivered within 6 mos. from date of contract. The rails are for the construction of the line between Peking and Changkakou.

KWONG-CHOW-WAN RAILWAY, CHINESE FRONTIER.—A Chinese merchant, Ho Fan, sent a petition to the viceroy of his province applying for permission to join with certain foreign merchants in constructing the Kwong-chow-wan Railway on the Chinese frontier, and was refused, because the Chinese are afraid that endless trouble would arise if foreign capital be allowed.

RAILWAYS IN SHANTUNG.—The gentry of the Province of Shantung have decided to build railways in that province themselves. Lu Hai-huang, president of the Board of Works and Treaty Revision Commissioner in Shanghai, has been appointed their representative. They have memorialized the Peking Government to appoint Wang Hsi-fang the director-general of the Railway Administration throughout the Province of Shantung.

SUNNING RAILWAY, CHINA.—Chan Yi-Ki, one of the promoters of the Sunning Railway, has returned from America to Hongkong, and at a subsequent meeting of the Sunning Commercial Company, the Sunning Railway affairs were put before the meeting. It is said that Chan returned with about $1,300,000 gold, which is lying in two of the Hongkong banks and which represent a portion of the capital subscribed by the Sunning people in America.

YUNNAN-SZECHUAN RAILWAY.—This line has been decided to be built with China's own funds, and the regulations have been presented to the Peking Government and a rescript issued to the proper authorities to attend to the matter. The Waiyupu, it is reported, has found some difference between the regulations of this proposed line and those of the Szechuan-Hankow Railway, and has ordered the viceroy of Yun Kwai to revise the regulations to coincide with those of the Szechuan-Hankow enterprise.

IMMENSE JAPANESE PURCHASES.—Japan continues to place immense orders for railway materials with manufacturers in the United States The latest announcement is that the Tokyo Government has just bought in the American market for immediate delivery 150 locomotives, from the Baldwin Works, to cost $2,225,000; 350 steel bridges from the United States Steel Corporation, to cost $503,000, and 2,000 steel cars, to cost $2,000 000. Apparently this mass of material is for work in Korea and Manchuria.

MALACCA RAILWAY.—The latest report from Mr. G. W. Fryer, chief resident engineer of the Malacca-Pulau Sebang Railway, states that the whole of the 21 m. is now linked in the junction effected with the Negri Sembilan extension at Tampin. Out of a total of 89 bridges and culverts, 85 have been completed and the remaining 4 are in progress. All station buildings at Malacca, Durian Tunggal, Alor Gajah and Tampin are nearly finished. The total amount expended on the railway to date of report was $271,717.

STUDYIND RAILWAY ENGINEERING, JAPAN.—There are now over 200 Chinese students in Japan studying railway engineering at their own expense. The majority of these students are natives of Hupeh, and as they are short of funds many have been obliged to give up their studies. This having been brought to the knowledge of Viceroy Chang Chih Tung, through a returned government student, the viceroy contributed $20,000 towards the expenses of the students, besides sending another batch of students to Japan.

JAPANESE RAILWAYS IN KOREA.—The latest report from Japanese sources with reference to the Korean railways is to the effect that trains will be running from Fusan to Seoul by January 1st, and that the military railway to Wiju will be completed as far as Pingyang. In March next ground will be broken for the Seoul-Gensan line. Surveyors have already started work, and it is hoped that the line will be finished by the end of the present year. In connection with the Seoul-Chemulpo line it will form the transpeninsular route between the Yellow Sea and the Sea of Japan. The trunk line from Fusan to the Yalu, and from Antung to Liaoyang in Manchuria, will bring Japan into direct touch with the Chinese Eastern Railway.

RAILWAY TO TANJONG PAGAR DOCKS, SINGAPORE.—Mr. J. H Williams, resident engineer, reporting on the progress of the work during July on the Singapore-Kranji railway extension to Tanjong Pagar Docks, 61,112 cub. yds. of earthwork were completed to date. On the two major bridges well sinking was done to the depth of 52 and 38 ft. respectively. Work was in progress on three minor bridges and the brickwork had been completed on these. Plate-laying was commenced at Pasir Panjang station-yard. Work was also done on four level crossings and railway are laid through Nelson and New Bridge roads. Favorable progress was made on station buildings and porters' lines at Borneo Wharf and Alexandra Road, and on the coolie lines at 4 m., 15 chains.

ELECTRIC LIGHTING, ETC.

TIENTSIN PRESS LTD., TIENTSIN.—The stationery department of the Tientsin Press, Ltd., now has electric light in use.

SINGAPORE TRAMWAYS.—The Singapore Electric Tramway Company has been granted an extension of the time limit for the completion of its system.

LIGHTING CONTRACT, KUALA LUMPUR.—Messrs. Howarth Erskine, Ltd., of Singapore, have secured the contract for lighting protection at the town hall and sanitary board offices at Kuala Lumpur.

WATERWHEELS, JAPAN.—The Pelton Water Wheel Company, of San Francisco, Cal., reports the sale of a 500-h. p. wheel, through Messrs Mitsui & Co., for use in an electric light station in Japan.

ELECTRIC LIGHT PLANT, PEKING.—The construction of the electric light plant at the Chinese capital is progressing. The central station is inside the Tartar City but the service, it is understood, will be extended to the Chinese City.

CONTROL OF TELEPHONES, CHINA.—The minister of the Board of Foreign Affairs at Peking has given notice that in future all telephones will be placed under the control of the Chinese Imperial Telegraph Administration, and that no private installations will be permitted in the interior. This, however, does not apply to private installations already established in the treaty ports.

ELECTRIC INSTALLATION, PERAK.—The new electric installation plant at the mine of the French Tin Mining Company, Perak, is a success, the heavy machinery having been splendidly erected and worked by a gas engine with great success. The gas is generated from charcoal at a daily cost of $14. The installation itself cost $70,000 to erect, and has reduced the machinery cost of working from 10 to 2 cts per picul of tin.

WATERWORKS AND IRRIGATION.

WATER SUPPLY SCHEME, KUALA KANGSAR, S. S.—This water supply scheme is said to be one of the cheapest works in Perak? It is estimated to cost under $70,000.

IRRIGATION, PERAK, F. M. S.—On the completion of the irrigation works in this Malay state, next year, the office of the irrigation engineer will be moved to Parit Buntar.

RANGOON WATERWORKS.—The application of the Rangoon Municipal Committee for a loan of Rs. 17,29,000 for the improvement of drainage and water system, and their extension, is published in the *Burma Gazette.*

WATERWORKS, NANKING.—Expectant Sub-Prefect Kung has applied to undertake the waterworks in Nanking, and the Board of Commercial Affairs has ordered the viceroy to report in detail if the gentry is capable of carrying out the project.

YE-U CANAL, BURMA.—The estimate of Rs 35,21,000 including indirect charges, for constructing the Ye-u Canal to take off from the right bank of the Mu River opposite the headworks of the Shwebo Canal, in Burma, has been sanctioned. The tract of country to be irrigated is situated in the Ye-u civil sub-division of the Ye-u District on the E. side of the Mu River. The canal will be 35 m. long, after which it continues a distributory channel for about 11½ m., and there will also be a branch canal for 13 m. The area commanded by the canal will be irrigated annually. The net revenue anticipated annually is Rs.1,89,000 per annum, equivalent to 5.37 per cent on the total outlay.

ARTIFICIAL IRRIGATION IN CHINA.—Mr. James Hutton, a well-known English writer on China's economics, has just published some interesting facts about the Kuan Hsien River system in the Chen-tu Plain. This vast area, of about 5,000 sq. m., is irrigated by the water system Mr. Hutton explains, and is thereby among the most fertile plains of China. It is said by the Chinese that the Chen-tu Plain originally was a vast marsh, through which the waters of the Min River flowed at will; and the casual observer might easily see that the present state of the works has been a gradual evolution, and doubtless many heads and hands have combined, many ways and means have been tried, and much treasure spent in order to regulate the wild and chaotic waters and introduce a system of artificial irrigation.

PENANG (S. S.) WATER SUPPLY.—The municipal engineer of Penang, Mr. L. M. Bell, has reported on the proposed additional water supply there from Batu Feringgi and other streams at the N. end of Penang Island. The report deals practically with three districts—Tanjong Bungah, Batu Feringgi, and Telok Bahang. After giving comprehensive details concerning various streams and sources of supply, the engineer shows that the Sungei Klean, in the Tanjong Bungah District, is the cheapest and most expedient source of tiding over the present difficulty. The present supply may be put down at 4,500,000 galls. daily. According to one estimate we may obtain from Sungei Klean an additional supply of 1,000,000 galls. per day, costing 6 cts. a thousand galls., the capital cost being $330,000. It would be possible to lead the supply from Sungei Klean into the waterfalls. This is the cheapest recommendation. On the other hand, if the municipality wishes to provide for the future too, it may take up the Batu Ferringgi scheme, giving an addition of 2,963,000 galls. costing 11 cts. a thousand galls., the capital cost being $1.853,000. Between these schemes there are two modifications.

BUILDINGS.

BUILDING CONSTRUCTION, UPPER PERAK, F. M. S.—The amount spent on works and buildings in this state during the last year was $11,185.89.

SINGAPORE CRICKET CLUB.—This organization contemplates the expenditure of $32,000 for the extension of its pavilion along extensive lines.

OFFICE BUILDINGS, PEKING.—Large offices at the headquarters of the Lu-Han Railway, Peking, are being built at the corner of Italian and Taichuchan roads.

AMERICAN CONSULATE-GENERAL, NEWCHWANG.—The new building of the American Consulate-General at this post is about ready for occupancy. It is a 2-story brick structure of great dimensions, with an attic. It is solid and artistically designed. The consul-general here is Mr. T. Sammons.

RAILWAY STATION, TIENTSIN.—According to the *China Review*, the raising of the ground for the new city railway station at that place is now almost completed, and the foundations will shortly be laid. On either side of the fine road from the station to the viceroy's yamen a number of new houses are being built by foreigners and Chinese officials. These houses are all of brick, some of them being altogether in foreign style, and some partly Chinese.

BRIDGES.

NEW STRUCTURE, TIENTSIN.—The bridge built by the Austro-Hungarian authorities from their concession to the city side of the river, has been formally opened.

BRIDGE DESTROYED, KOREA.—It is reported that the bridge over the Milyang River on the Seoul-Fusan Railway, has been totally destroyed by a storm, causing traffic to be suspended for 170 m.

LUHAN BRIDGE, CHINA.—The Luhan railway bridge over the Hoang-ho is to be insured by a foreign company for Tls. 4,000,000. The insurance company is sending out an engineer to examine the bridge before finally taking the risk. The policy is to protect the structure against damage or destruction by the swift and uncertain current of "China's Sorrow."

PUBLIC WORKS.

ROADS AND STREETS, UPPER PERAK F. M. S.—During one year $15,897.80 were spent on roads, streets, etc., in this state, and about 50 m. of cart road and agricultural paths kept in good order.

ROAD IMPROVEMENTS, PEKING.—Many improvement, to the roads of Peking are under way. The Hata, men and Taichuchan roads, in addition to Italian and Nanting-men roads, have been mecadamized, and are fine highways. No heavy carts are allowed on them, a special space being reserved on either side for native traffic.

TELUK ANSON-HUTAN MELINTANG ROAD, LOWER PERAK, F. M. S.—The earthwork on this improvemen has been completed and the metal required col lected, More than 10 m. of the road have already been opened to traffic. This road when produced from the point at which it crosses the Jandarata Canal to the coast, will be a most important factor in the development of the district.

FEDERATED MALAY STATES SURVEY.—During the last year the field staff of the Revenue Survey Department, Federated Malay, States, surveyed 842 town and village lots, 433 lots containing 10,359 acress of mining land, 301 lots containing 2,735 acres of agricultural land, 612 miles of traverses of roads' rivers, etc., and domarcated or subdilvded 4,836 lot4 containing 15,870 acress of native holdings, besides 20,000 acress of forest reserves.

IMPROVEMENTS IN CALCUTTA.—The Government of Bengal has put forth a schame for the improvement of Calcutta by checking over-crowding and clearing away slums. The schome will be carried out by an improvement truts, consisting of president and six trustees, all appointed by the government, and their functions will be transferred to the Calcutta Corporation as soon as the work is completed The work consists of the making of broad roads, the provision of open spaces, and the acquisition of land for expansion. The rate of progress will be conditioned by the receipts. If the measures proposed yield results according to the present estimate, the whole work should be completed within 20 yrs. The proposals look to capital expenditure of 822 lakhs of rupees. Roughly proposed new roads accunt for 505 lakhs, open spaces for 172 lakhs, land acquisition for expansion 100 lakhs, and improvements to such land 50 lakhs.

PORT WORKS, DREDGING, DOCKS, ETC.

DREDGING AT TIENTSIN.—A bucket dredger is now engaged in dredging operations a short distance above the Austrian Bridge. This structure is still under repairs.

IRON LIGHTHOUSE, KUALA SELANGOR, S. S.—Tenders have been invited by Trinity House, London, for the construction of an iron lighthouse, Kuala Selangor Hill Lighthouse, Straits Settlements, together with a lantern and plate glass for the same.

DREDGES FOR SIAM.—Two new dredges recently arrived at Bangkok from Europe for the Irrigation Department of the Siamese Government. They were specially made by Messrs. A. F. Smulders of Rotterdam for opening up and clearing old klongs that have become practically cleared up. Each has a capacity of 75 cub. met. an hour.

FLOATING DOCK, TSINGTAO, CHINA.—A large floating dock having a bearing capacity of 16,000 tons and a length of 150 met, having been successfully launched at Tsingtao, has been towed by tug boats to the place prepared for it in the harbor and moored. This is the largest floating dock launched after having been fully completed on shore, according to the *Hongkong Telegraph.*

COALING PLANT, PHILIPPINE ISLANDS.—The following bids have been received by the Bureau of Yards and Docks, Washington, D. C., for coal storage and coal handling plant, Naval Station, Olongapo, P. I.: The Snare and Triest Company, 143 Liberty-st, New York, Item $1,500,000 conditional; (2) $500,000 conditional; (3) $500,000 conditional; (4) $500,000 conditional; J. G. White & Co. Inc., 42 Exchange-pl, New York, 1,$499.500.

HONGKONG DOCKYARD EXTENSION.—A parliamentary white paper, recently issued, shows the work upon which expenditure is proposed to be provided for under the British naval works bill of the present session. The total estimated cost of the Hongkong dockyard extension is given at £1,500,000. The estimated expenditure for the fiscal years 1905-1906 and 1906-1907 is given at £476,000 The works are expected to be completed in the fiscal year 1907-1908.

SHIPBUILDING, MARINE, ETC.

OSAKA SHOSEN KAISHA.—This Japanese steamship company has ordered from the Kawasaki Shipbuilding Company the construction of two passenger steamers of 2,500 tons each for its Formosan trade.

NIPPON YUSEN KAISHA CONTRACTS.—It is announced that this Japanese steamship company is about to place contracts with Clyde shipbuilding firms for eight new liners.

SUNKEN STEAMERS SOLD.—Twenty-one steamers, sunk outside Port Arthur, have been sold by tender to five different Japanese, who accepted some three vessels each, their bids ranging from -Y-5,000 to -Y-22,000.

SISTER SHIPS LAUNCHED, JAPAN.—*Ike-maru* and *Tsushima-maru*, sister ships, built at Nagasaki for the Sanyo Railway Company, to run between Shimonoseki and Fusan, have been launched, and will soon be ready for service. *Ike-maru's* contract speed is 13 knots, but she made 14½ on her official trial trip.

NEDERLAND STEAMSHIP COMPANY.—This company is building at Amsterdam two new passengers steamers to replace two of the slower ones. These new ships are expected to make the run from Europe to the Far East as quick as that of any other companies. They are not expected to be ready for sailing until the end of next year.

NEW CHINA COAST STEAMER.—A new steamer, built to the order of the Chinese Engineering and Mining Company, is reported to be *en route* from London to Shanghai. She is to be on the Shanghai-Chinwangtao run, and is called the *Kaiping*. She carries 3,000 tons dead weight and has accommodation for twenty-five saloon passengers. She is fitted with electric light and fans, as well as other up-to-date comforts of modern passenger steamers.

SALE OF ARMY TRANSPORTS, JAPAN.—It is announced in the daily press that an Anglo-Japanese corporation, whose identity is not disclosed, has purchased forty of the best steamships which the Japanese Government impressed for military service at the outbreak of the war with Russia Messrs. Mitsui & Co. are said to have negotiated the deal, the object of the purchasers being to make extensive alterations in the ships and then place them in the commercial carrying service of Japan.

FERRY STEAMERS, NAGASAKI.—Two ferry steamers are now under construction at the Mitsu Bishi dockyard, Nagasaki, for the Sanyo Railway Company's service to Korea. The entire Japanese system will thus be brought into close connection with the Korean system, through that with the Manchurian and Siberian railways, and so on through the European railways to London. Before long the traveller may make the journey from Tokio to London with scarcely 12 hrs. on the water.

NEW DOLLAR LINE STEAMSHIP.—A new steamship, to be known as *Bessie Dollar*, will be launched at Port Glasgow, Scotland, in October, for the Robert Dollar Steamship Company of Victoria, B. C., and will be used in the Pacific for general trade, but particularly for the lumber-carrying business. The vessel is a duplicate of *Hazel Dollar*, lately built in Scotland, and will have a capacity for 7,080 tons of freight, or about 3,000,000 ft. of lumber. Captain Gow will command *Bessie Dollar*. He brought *Hazel Dollar* out to the Far East, but was succeeded by captain C. H. Cross.

LAUNCH OF "HSIN CHANG."—This new vessel, built for China coast trade at Yoker-on-Clyde by Messrs. Napier & Millar for the China Merchants' Steam Navigation Company, has been launched. Her dimensions are as follows: Length 270 ft., breadth 40 ft., and depth 21 ft. 6 in., with a gross tonnage of about 2,000 tons. The machinery, which is being supplied by Messrs. Dunsmuir & Jackson, Govan, consists of triple-expansion engines, having two boilers of large size. The hull and machinery have been constructed under the direction of Messrs. G. & J. Weir Ltd., engineers, of Glasgow.

JAPAN'S INCREASED MARINE.—During the war Japan purchased 230,000 tons of shipping and 156,000 tons were chartered to replace the vessels requisitioned for the public service. Moreover 140,000 tons were captured, and since the ships destroyed and lost aggregate less than 60,000 tons, there has been a net increase of 450,000 tons as compared with the period immediately preceding the war. Whereas the entrances and clearances of foreign vessels in Japanese ports showed a decrease of 60 per cent during the war, there was an increase of 20 per cent in the quantity of goods moved, which shows that great activity must have prevailed in Japanese shipping circles during the period under consideration.

WEIHAIWEI SHIPPING.—According to a recent statement in *The South China Morning Post*, during the year 1904 steamers numbering 315, exclusive of naval colliers, government transports, and small coasting steamers, entered Weihaiwei, representing a tonnage of 317,595 tons. The figures for the two previous years are as follows: 1902, 146 vessels with an aggregate tonnage of 151,809; 1903, 242 vessels with an aggregate tonnage of 244,910. These figures do not include small steamers mostly owned by Japanese trading with Chefoo, Dalny, and other places in the Gulf of Pechili A record is now being kept of such steamers, which shows that during the first quarter of 1905 no fewer than sixty-four entered Weihaiwei, representing a tonnage of 14,154 tons.

LAUNCH OF "TJILIWONG."—A new steamer for the Java, China-Japan line, *Tjiliwong*, of which the head agency is at Hongkong, was recently launched at Amsterdam. The dimensions of the vessel are as follows: Length 373 ft., width 49 ft. 5 in., depth 30 ft. 1 in., while the capacity of 6,750 English tons. The Steamer is constructed according to the spar deck type, and although designed for the carriage of cargo, there are two cabins for forst-class and six cabins for second-class passengers, as well as a drawing-room, bath-rooms, etc. The steamer will be propelled by engines of the tripl-expansion type having a capacity of 1,669 h. p. and giving a speed 10.25 English miles. The complete engines are also constructed at Amsterdam, and the steamer is the largest vessel which has over been constructed in that city.

"KAIPING'S" TRIAL TRIP.—The steamer *Kaiping*, built to the order of the Chinese Engineering and Mining Company by Messrs. Swan, Hunter & Wigham-Richardson, Wallsend-on-Tyne, was given her trial trip recently. The vessel measures as follows: Length over all, 322 ft.; beam, extreme, 44 ft. 3 in.; and depth moulded, 23 ft. She has been designed for the owner's special trade on the China Coast. She has been built to Lloyd's highest class, spar-deck rule Accommodations have been provided for first-class passengers amidships and a large number of Chinese passengers aft. The vessel has been designed to carry a large cargo on a draught of 18 ft. 9 in., and to steam 12½ knots at this draught. The engines have been constructed by the Wallsend Slipway and Engineering Company, and consist of a set of triple-expansion engines. Steam is supplied by two large single-ended boilers working at 180 lbs. pressure. On the trial trip the machinery worked without a hitch, and a mean speed of 13 knots was obtained, the vessel being fully loaded. The ship has been built under the supervision of Captain Macfarlane.

MINES AND MINING

COAL DISCOVERY, PORT ARTHUR.—A splendid seam of coal is reported to have been discovered by accident recently at Port Arthur, 2¼ m. from Pigeon Bay.

RUSSIAN OIL INDUSTRY, CHINA.—The Tarters are prohibiting the Russian oil companies from resuming work in the oil districts of thesr territory.

DUTCH COAL, SUMATRA.—The government coal miner at Ombilien, Sumatra, produced during the yeas 1904 205, 581 tons against 201,311 tons in 1903 and 180,000 tons in 1902.

MANCHURIAN PETROLEUM.—It is reported that the Standard Oil Company of New York is taking steps to get hold of the oil fields of Manchuria now that the Russian grip on them has loosened.

COAL IMPORTS, HONGKONG.—The annual report of the Department of Mines, New South Wales, shows among the greatest decreases in coal exports of 1901 that 22,337 tons less than in the previous year were sent to Hongkong.

MINES IN LIANGKIANG PROVINCES.—The viceroy of these provinces has memorialized the Chinese Government that Chinese only should be permitted to develop the mineral resources of this territory, and foreigners excluded.

TIN MINE SOLD, KUALA LUMPUR.—The Sungei Besi mine at Kuala Lumpur has just changed hands, Towkay Foo Choo Choon having taken it over from Towkay Yap Loong Heng for the sum of $62,000. The property covers an area of over 120 acres.

FRENCH CONCESSION, KWANGSI PROVINCE, CHINA.—A French syndicate which holds a valuable lead mine concession in this province has asked permission of the governor to resume operations which were stopped on account of the rebellion.

MANCHURIAN MINES IN JAPANESE HANDS.—It is reported that all the mines near Liaoyang Tehling, FengHuangchen, and other places in Manchuria, have been worked lately by the Japanese. The Chinese authorities report that they are never informed before-hand of the transfer of such property. It is said that there is an army of Japanese engineer surveying the mineral resources of the country.

BRITISH GOLD MINES, KOREA.—According to the *Korea Daily News* the British gold mines at Ap-tusan, Korea, have "petered" out and will no longer pay for working by foreign methods. The owners of the property, the Pritchard-Morgan Syndicate, hope, however, to get some of their money back by farming out claims to Koreans, who, with their primitive methods and low expenses, can still work the property at a profit.

GOLD MINE DISCOVERY, CHINA.—A marvellously rich gold mine is reported to have been discovered in the Loo Loong District of Wing Ping Prefecture of Chihli Province So plentiful is the supply of gold-dust and nuggets that it is reported that a party of thirty miners obtained 1,300 ozs. of gold from alluvial washings in ten days The government has taken possession of the find, and it is said they will immediately be worked on an extensive scale.

EAST BORNEO COMPANY, AMSTERDAM.—The working of the coal mines in this company's Far Eastern possessions is being confined to what is strictly necessary, the position of the company being overshadowed by the contracts with the Royal Petroleum Company, which is working bores on ground for which concessions were given to the East Borneo Company. The latter's loss in 1905 is stated at fl.60.261, which is booked on the head concessions, etc. The Koetie Exploration Company has also ground on which the Royal Petroleum Company is making a survey for the working of petroleum.

MINING CONCESSION, YANGTSZE VALLEY, CHINA — Sir John Lister Kaye has obtained an important concession in the Province of Anhui, where, it is believed, a perfect deposit of iron ore exists, distant only 3½ m. from the Yangtsze River. The concession is granted for a period of 60 yrs with a possible extension, and the total area of the concession is about 50 sq m. It is estimated that there are 6,500,000 tons of iron ore in sight, and possibly a further 3,500,000 tons, and that if smelters are erected 1,850,000 tons of pig iron could be made from 5,500,000 tons of ore to be selected from the above-named mass. Mining engineers are now at work developing the property.

GOLD DREDGING, KELANTAN, SIAM.—A progress report observes that in consequence of various difficulties in erecting the dredgers in the Dependency of Kelantan it has been found necessary to engage a highly qualified mechanical engineer. As a result Mr. J. F. Gage has been secured as general manager of the properties. In spite of a series of mishaps with the first dredger the work done has been sufficient to confirm the opinions expressed by experts that the Kelantan company possesses valuable property. Mr. Gage gives it as his opinion that the ground already worked will pay to go over again, and that for all practical purposes the property has not yet been touched. It is hoped that before the end of the current year three dredgers will all be at works.

KOLAR GOLD FIELDS, INDIA.—Following are the returns for the month of August, 1905: *Balaghat.*—4,200 tons of quartz crushed yielded 3332 oz and 2,750 tons of tailings cyanided produced 290 oz., making a total production of 3,622 oz. of gold as compared with 3,547 oz in July last. *Champion Reef.*—Milled 19,410 tons which produced 15,622 oz. 17,277 tons tailings treated by the cyanide process produced 2 381 oz, making a total production of 18,003 oz of gold, as compared with 18,012 oz. in July last. *Hutti*—(Nizam's) 1,10, oz. of gold from 2,200 tons of quartz crushed, and 110 oz. from 1,300 tons of tailings cyanided making a total yield of 1,217 oz. of gold as compared with 1,106 oz. in July last. *Mysore.*—16,050 tons of quartz crushed produced 15,011 oz estimated gold in melted copper plates 1·4 oz., and 11,175 tons of tailings cyanided yielded 1,853 oz., making a total production of 17,039 oz of gold, as compared with 17,039 oz. in July last. *Mysore West.*—Mill ran 684 hours and crushed 2,112 tons and yielded 1,001 oz. bar gold. *Nundydroog.*—6,500 tons of quartz crushed yielded 4,666 oz. and 7,290 tons of tailings cyanided yielded 705 oz., making a total production of 5,371 oz. of gold, as compared with 5,751 oz in July last. *Ooregum.*—Staff crushed 10,314 tons gold produced 4,430 oz. and slimes and tailings cyanided 10,201 tons, yielded, 1,076 oz, a total production of 5,506 of gold as compared with 5,487 oz., in July last.

IMPROVEMENTS IN THE PHILIPPINES.

WATER DISTRIBUTION SYSTEM, MANILA.—An extension of the water mains at Santa Mesa Heights is under construction.

MUNICIPAL BOARD, MANILA.—Sr. Cruz Herrera, president of the Municipal Board of Manila, has retired from office His successor is Judge Roxas, of the Court of First Instance.

PROVINCIAL SUPERVISORSHIP, BULACAN.—Mr. Roy C. Hardman, C. E., assistant in the Bureau of Engineering, has been appointed to the office of supervisor of the Province of Bulacan.

SCHOOL OF ENGINEERING, MANILA.—Certain Filipinos who have graduated as civil engineers abroad have petitioned Commissioner Smith, Secretary of Education, to establish a school of engineering in Manila for the natives of the Islands. The matter is receiving serious consideration.

AYALA BRIDGE, PASIG RIVER, MANILA.—The contract for the construction of the abuttments and piers of the new Ayala Bridge, spanning the Pasig River, Manila, and removing the old structure, has been awarded to the Atlantic, Gulf and Pacific Company, of New York, San Francisco, Seattle, and Manila.

RAILWAY BIDS, PHILIPPINES.—The date on which the bids for the construction of the Philippine railways are to be opened at Washington has been postponed from November 1st, 1905, to December 15th, or for 45 days. This is to enable the Governor-General to be present. The conditions of the bids otherwise remain the same.

HOTEL CONSTRUCTION, MANILA.—According to Commissioner W. Cameron Forbes, Secretary of Commerce and Police, the Government will advertise in about 4 mos. for bids for the construction of the big hotel which is to occupy one wing of the Luneta reclamation extension. One feature of the hotel will be a protected wharf or dock which will be very convenient for the use of launches.

PORT WORKS.—By resolution of the Philippine Commission, dated September 14th, 1905, the sum of ₱36,000 was appropriated for the investigation of ports throughout the Islands, in connection with the proposed railroad construction. This work is to be carried out by two survey parties under the direction of Major L. W. Fisk, C. E., U. S. Army, officer in charge of port works.

MOAT IMPROVEMENTS, MANILA.—The grading and terreplaning of the moat around the walls of the old city will begin at an early date. The surveys have been completed and the lines run by the city engineer showing where streets and sidewalks will be located This improvement will also include the new drive along the Malecon from the Anda Monument to the Legaspi Monument on the Luneta.

EPISCOPAL CATHEDRAL, MANILA.—The Atlantic, Gulf and Pacific Company has secured the contract for the construction of the new Episcopal cathedral. The building is to be of reinforced cement throughout, the foundation resting on piles, and must be completed within a year after the work is begun. Mr. William H. Robinson, C. E., has been appointed engineer and supervisor of construction.

TARLAC RIVER CONTROL.—Surveys and estimates have been completed for the protection of the country adjacent to the Tarlac River, Northern Luzon, from overflows to the E. This work will be of large benefit to the section involved, and is the first practical step of the Insular Government in the general scheme of river control now being investigated in Luzon. The estimated cost of the levy construction for which plans have been prepared, is ₱100,000.

NEW TELEPHONE SYSTEM, MANILA.—Construction work on the new telephone system for Manila will soon be commenced by the Pacific Coast Telephone Company of San Francisco, owners of the franchise. Poles and wiring are now on the way from America. The "central energy" system of 'phones, the latest and most serviceable, will be installed. With this instrument there is no necessity of ringing up central, the mere lifting of the receiver from its hook notifying "central" who calls for the number wanted.

CITY LIGHTING, MANILA.—Mr H Baer, of Solothurn, Switzerland, has petitioned the Municipal Board of Manila for a franchise for the installation of a gas-lighting system in the city. The franchise is to continue for 50 yrs., at the expiration of which time the applicant agrees to sell the plant to the municipality, reserving, however, the right to sell the system to a third party prior to the expiration of the half century. The application is in the hands of the committee on illumination for investigation and report.

GRAVITY WATER SUPPLY, MANILA.—Major J. F. Case, C. E., chief engineer, Department of Sewer and Waterworks Construction, reports that work on the new conduit road is being pushed. About 9 m. of road is immediately necessary, and of this distance 4 m. are practically complete. This road parallels the pipeline and conduit and will be used for construction purposes After completion of the work it will become a public highway. Cable reports from Washington indicate that many contractors are interested in the sewers and water system construction.

MUNICIPAL BUDGET, MANILA.—The Municipal Board of the City of Manila has cut out of the list of estimates for the fiscal year 1905-1906 the proposition to purchase Suspension Bridge, which spans the Pasig River, thus saving ₱92,000, and likewise eliminated an item of ₱15,000 for the construction of streets through the San Lazaro Estate. The board has also reduced the figures for the repair and construction of river walls along the Pasig from ₱336,000 to ₱58,000, thus effecting a total reduction in the estimate of ₱387,000. The land tax has also been reduced from 2 per cent to 1½ per cent. The board has asked the Philippine Commission to grant the municipality a loan of ₱280,000 for 5 yrs., payable at the rate of ₱56,000 annually.

INSPECTING PROSPECTIVE RAILWAY ROUTES.—Messrs. Wallace and Holabird, engineers representing the Harriman railway interests in America, after making a careful survey of the proposed railway routes set down by the government in the Philippines, have just returned from Baguio, the summer capital, where they went with Mr. J. W. Beardsley, Consulting Engineer to the Philippine Commission, to inspect the proposed route to that point, along what is known as the Benguet Road General Manager Horace L. Higgins, of the Manila Railway Co., Ltd., accompanied by Mr. Metcalf, the engineer representing Messrs. Speyer Brothers of New York and London, who control the stock on the Manila-Dagupan System of railways, has just returned from a tour of inspection of the lines with reference to the future railway construction under government favor. It is understood that the Speyer interests will be prominent bidders for the government concession in the Island of Luzon.

INVESTIGATING MANILA PORT WORKS.—Mr. D. D. Mackie, consulting engineer to the Colonial Government of Singapore, has been in Manila on behalf of his government seeking information on the question of the dock and docking improvements which the Philippine Government is about to inaugurate here in connection with the harbor improvements. Mr. Mackie's mission has special reference to the expropriation of the Tanjong Pagar docks at Singapore by the British Government. It has been decided that the hearing of the arbitration will take place in Singapore about the 20th day of the current month Sir Michael Hicks-Beach, who will preside at the arbitration, arrived in Singapore from England the fore part of the month. His confrères from the home country are Mr. Ommanney, solicitor for Messrs Sutton, Ommaney & Rendall; Mr. Place, valuer, of Messrs Wheatley, Kirk & Price, and Mr. Maltby, accountant, of the Deloite, Dever and Griffiths Company, all of London.

CEBU IMPROVEMENT—The destructive fires which visited Cebu, capital of the Province of Cebu, in 1902 and March of the current year, have afforded an opportunity for the improvement and widening of the streets of that city. An improvement committee consisting of Mr. J. W. Beardsley, C. E., consulting engineer to the Philippine Commission; the provincial supervisor of Cebu, the *fiscal* of the Province of Cebu, and the president of the Municipality of Cebu, was appointed by resolution of the commission, dated March 21st, to have prepared detailed plans for the widening of streets through the burned area, and the laying out of new streets. To expedite this work the commission has granted the committee power to "acquire title to all lands within said area by gift, cession, or transfer from present claimants of said lands," and to make the necessary allotment of new tracts of land for the purpose of completing the work. A commendable spirit has been shown by the land owners of Cebu, according to the members of the committee, in this matter, and there seems to be little doubt that the city will be greatly benefited by the contemplated alterations

FINANCIAL NEWS.

SIAM ELECTRICITY COMPANY, BANGKOK.—This company has declared a half-yearly dividend of 6 per cent.

TEBRAU COMPANY, HONGKONG.—This planting venture, which works in Johore, has taken steps towards liquidation.

SAVINGS DEPOSITS, JAPAN.—The deposits in the Japanese Postoffice Savings Banks have increased -Y-10,-500,000 in the last 8 mos.

HONGKONG HOTEL COMPANY, LTD.—This company made a profit of $114,546 in the first 6 mos. of 1904. A dividend of 10 per cent will be paid.

PENANG HILLS RAILWAY COMPANY.—The Penang Hills Railway Company, of Penang, S. S., has decided to float an additional loan of $25,000 on debentures, at 6 per cent.

UNION INSURANCE SOCIETY, HONKONG.—The shareholders of this society have been notified that a dividend of 40 per cent is declared and handsome sums carried to the reserves.

HONGKONG BUDGET.—The Hongkong Budget is expected to close this years with a deficit of over $78,000. The revenues for 1906 are estimated at $7,347,395, with an outlay of $7,056,955.

COMMERCIAL BANK, TIENTSIN.—A commercial bank named Tung-Yu is being established by the Chinese Chamber of Commerce The capital subscribed is Tls. 70,000, Tls. 30,000 being advanced by the officials.

DOUGLAS STEAMSHIP COMPANY, HONGKONG.—At the end of the business year June 30, 1905, the book values of this company amounted to $197,100.55. The company will pay a dividend of 7 per cent on its capital stock, amounting to $70,000.

KLANG COFFEE CULTIVATION COMPANY, PENANG, S. S.—The annual general meeting of this company was held in Penang recently. The loss on the year's working was $2.732, but there was an actual profit on the old working. The net revenue for the year was $20,732.

NIPPON GINKO, JAPAN.—This Japanese bank, with a paid-up capital of £3,000,000, made a net profit for the first half of 1905 of £230,037, to which has been added £16,281 brought forward. It pays a dividend at the rate of 12 per cent *per annum*, puts £65,000 to reserve, and £17 to bonus and allowances, and carries forward £41,656. The total assets of the bank on June 30th last were £52,872,015.

ENGINEERING AMALGAMATION, SINGAPORE.—It has been officially announced that the proposed amalgamation of the engineering firms of Howarth, Erskine & Co., Ltd., and Riley, Hargreaves & Co., Ltd., has been abandoned. During the negotiations for the amalgamation the work of both companies was carried on separately as before, and the abandonment of the scheme caused no dislocation whatever.

INTERNATIONAL BANKING CORPORATION.—The Hongkong branch of this financial institution has removed from the old premises at No. 9, Queen's-rd. The new house of the bank has been handsomely decorated and furnished, and possesses one of the longest lengths of counters of any bank in the Far East. The offices are splendidly furnished and altogether they are ideally arranged for a bank in the tropics.

BANGKOK OPIUM FARM.—The whole of this enterprise has been taken over by Phya Dhipa Kosa, Phra Piboon (Siang Kee) and members of the former syndicate who held the last farm. This newly-formdl syndicate nas taken the farm at the full rentaeof Tcs. 8,800,000 *per annum* for 5 years.

YOKOHAMA SPECIE BANK, JAPAN.—At the half-yearly ordinary meeting of the Yokohama Specie Bank, Ltd., held at head office, Yokohama, recently, a dividend at the rate of 12 per cent was declared; -Y-220,000 added to reserve fund, and -Y-600,000 carried forward to current account.

BRITISH HUNAN MINING SYNDICATE, LTD.—This syndicate has been registered in London, with a capital of £10,300, in 10,000 ordinary shares of £1 each, and 6,000 deferred shares of 1s. each. Its object is to adopt an agreement between L. Spitzel of the first part, S. Neumann & Co. of the second part, Messrs. Farrar Brothers of third part, and this company of the fourth part, to acquire lands, mines and other properties and rights in the provinces of Hunan and Szechuan, China, or elsewhere, and to carry on the business of general miners, explorers, smelters, and reducers of ore and minerals, etc.

IMPERIAL CHINESE RAILWAYS.—The net half-yearly profits of the Imperial Chinese Railways for the 6 mos. ended March 1, 1905, amount to a little over £325,000, and if this rate of progress is maintained, as is confidently expected, the year's profits will, even after paying interest on the loan and providing the stipulated sum for amortization, amount to over £600,000. With this sum the Chinese Government has already

(Continued on p. XVII, advertising section.)

FAR EASTERN STOCKS AND QUOTATIONS

COURTESY OF BENJAMIN, KELLY & POTTS, SHAREBROKERS, HONGKONG, October, 1905.

STOCKS	WHEN ESTAB-LISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation* PER CENT	CLOSING QUOTATIONS
Banks.												
Hongkong and Shanghai Banking Corporation	1865	$10,000,000	80,000	$125	$125	g £1,000,000 s $8,500,000 i $250,000	$1,702,728	30-6-05	£1.15/- at exchange 1/10½= $18.66.67 for first half-year 1905	21-8-05	5	$900 sellers London £91
National Bank of China, Limited	1891	£699,475	99,925	£7	£5	$200,000	$41,768	31-12-04	$2 (London 3/6) for 1903	1-2-04	—	$38 buyers
Marine Insurances.												
Canton Insurance Office, Limited	1881	$2,500,000	10,000	$250	$50	[illegible] $1,400,000 j $81,739	$150,494	31-12-03	$17 for 1903	22-10-04	5	$337½ buyers
China Traders' Insurance Co., Ld.	1865	$2,000,000	24,000	$83.33	$25	$950,000 f $151,992 j $362,366 u $371,445	Nil.	30-4-04	$4½ for year ended 30-4-1904	8-12-04	5¾	$79 sales
North China Insurance Co., Ld.	1863	£150,000	10,000	£15	£5	Tls. 800,000	Tls. 217,119	30-6-04	Interim of 7/6 for 1905	1-5-05	8	Tls. 82 buyers
Union Insurance Society of Canton, Limited	1867	$2,500,000	10,000	$250	$100	s $1,850,000 g £20,000 f $372,749 j $893,100 u $846,773	$2,078,997	30-6-04	$35 for 1903	21-1[illegible]-04	4½	$780 buyers
Yangtsze Insurance Association, Ld.	1862	$800,000	8,000	$100	$60	$750,000 i $50,000 j $5,890	$599,364	31-12-04	$12 and $3 special dividend for 1903	12-4-05	8½	$172½
Fire Insurances.												
China Fire Insurance Co., Ld.	1870	$2,000,000	20,000	$100	$20	$1,000,000 x $218,039 f $2,241	$260,374	31-12-04	$6 dividend and $1 bonus for 1903	10-3-05	8	$87½ buyers
Hongkong Fire Insurance Co., Ld.	1868	$2,000,000	8,000	$250	$50	$1,200,505	$360,372	31-12-04	$34 for 1903	7-3-05	10	$340 sellers
Shipping.												
China and Manila Steamship Co., Ld.	1882	$750,000	(1) 30,000	$25	$25	$5,000	$8,832	31-12-04	$1 for 1904	27-3-05	5½	$18 sellers
Douglas Steamship Co., Ld.	1883	$1,000,000	20,000	$50	$50	$261,638 i $88,941	Nil.	30-6-05	$3½ for year ended 30-6-1905	25-9-05	10¾	$32 ex div.
Hongkong, Canton and Macao Steamboat Company, Ld.	1865	$1,200,000	80,000	$15	$15	e $250,000 di $600,000 f $145,376	$8,064	30-6-05	$1 for first half-year 1905	16-8-05	7½	$26¾ buyers
Indo-China Steam Navigation Company, Ld.	1882	£1,200,000	(2) 60,000	£10	£10	£120,000 i £241,150 h £3,999	£4,435	31-12-04	12/- @ 1/10 7-8=$6.29.51 for 1904	13-7-05	6½	$95
Shanghai Tug and Lighter Co., Ld. Do. Preference	1903	Tls.1,500,000	200,000 100,000	Tls. 50	Tls. 50	i Tls. 25,000	Tls. 43,762	31-12-04	Interim of Tls. 2. for 1905 Interim of Tls. 1¾ for 1905	28-8-05	7¾ 8	Tls. 59 sales Tls. 47 sales
"Shell" Transport & Trading Co., Ld.	1898	£2,000,000	2,000,000	£1	£1	£400,000 i £4,116	£58,852	31-12-03	Interim of 1/- (Coupon No. 5) for '04	1-1-05	4¾	21/- sales
"Star" Ferry Co., Ld.	1898 1900	$200,000	10,000 10,000	$10 $10	$10 $5	$65,000 i $24,257	$929	30-4-05	$1.80 $0.90 cents for year ended 30-4-05	29-5-05	5½ 3¾	$33 sellers $25 sellers
Straits Steamship Co., Ld.	1890	$500,000	(3) 5,000	$100	$100	$400,000 e $21,075 i $130,153	$21,231	31-12-04	$10 for 1904	21-3-05	7	$142½
Taku Tug & Lighter Co., Ld.	—	T.T 1,500,000	30,000	T.Tls.50	T.Tls.50	Tls. 98,000 d Tls. 195,479 e Tls. 28,000 i Tls. 81,200	Tls. 4,333	31-12-04	Interim of Tls. 2 for 1905	27-7-05	13¾	Tls. 29
Refineries.												
China Sugar Refining Company, Ld.	1878	$2,000,000	20,000	$100	$100	e $450,000 r $150,000	$42,812	31-12-04	Interim of $10 for 1905	18-8-05	10½	$230
Luzon Sugar Refining Company, Ld.	1882	$700,000	7,000	$100	$100	none	Dr. $85,987	31-12-04	$3 for 1897	24-3-98	—	$15½ buyers
Perak Sugar Cultivation Co., Ld.	—	Tls. 350,000	7,000	Tls. 50	Tls. 50	Tls. 100,000	Tls. 1,635	30-9-04	Tls. 2½ for year ending 30-9-1904	17-12-04	3¾	Tls. 68 sales
Mining.												
Chinese Engineering & Mining Co., Ld.	1901	£1,000,000	1,000,000	£1	£1	d £40,000 h £12,289	£7,820	29-2-04	Interim of 1/- (No. 4)	1-7-05	—	Tls .9 buyers
Oriental Consolidated Mining Co., Ld.	1901	G.$5,000,000	y 500,000	G. $10	G. $10	none	G. $672,093	31-12-04	Interim of 50cts. (gold) for '95 (No. 5)	11-7-05	—	G. $17
Raub Australian Gold Mining Co., Ld.	1892	£200,000	150,000 50,000	£1 £1	18/10 £1	£4,873	Dr. £8,745	31-3-05	No. 12 of 1/-=48 cents	28-1-01	—	$4

STOCKS	WHEN ESTABLISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation* PER CENT	CLOSING QUOTATIONS
Docks, Wharves and Godowns.												
Farnham (S. C.), Boyd & Co., Ld	1901	T5,520,000	55,200	T100	T100	T1,000,000	.........T34,924	30-4-05	Final of T8 making T13 for 1904/05	24-6-05	9½%	T144 sales
Fenwick (Geo.), & Company, Ld.....	1889 1905	$450,000	6,000 *z* 12,000	$25	$25	$70,000	.... $8,577	31-12-04	$3¼ for 1904.. on 6,000 shares... First year..............................	13-3-05 —	7½% —	$27 $25
Hongkong and Kowloon Wharf and Godown Co., Ld......................	1886	$2,000,000	40,000	$50	$50	$250 000 *d.r.* $58,423 *i* $10,000 *p* $300,000	.........$29,422	31-12-04	Interim of $2½ for 1905..................	26-7-05	4¾%	$104
Hongkong & Whampoa Dock Co., Ld.	1901	$2,500,000	50,000	$50	$50	*i* $41,500	........$501,332	30 6-05	$6 for first half year '05	22-8-05	7	$185 buyers
New Amoy Dock Co., Ld....................	1892	$40,500	6,000	$6¾	$6¾	$55,500	...............$489	31-12-03	$1¼ for '03....................................	5-5-04	7	$17 sellers
Shanghai and Hongkew Wharf Co. Lt.	1902	T3,200,000	32,000	T100	T100	*b* T487,210 *r* T59,880	.........T10,711	31-12-04	Interim of T6 for 1905..................	23-8-05	6½%	T187½ buyers
Yangtsze Wharf and Godown Co., Ld..	1902	T250,000	2,500	T100	T100	T17,500	..........T2,762	31-12-05	T18 for '04..	29-3-05	9¼%	T192½ buyers
Lands, Hotels and Buildings.												
Astor House Hotel Co., Ld..................	1901	$750,000	(4) 30,000	$25	$25	$14,156	...........$9,028	30-6-05	$2½ for year ending 30-6-05.........	19-8-05	9 %	$28 buyers
Astor House Hotel, Ld. (Tientsin)	—	T. T100,000	2,000	T. T50	T. T50	T34,000 *e* T8,000	.... T806	29-2-05	Final of T5 making T9 for the year.	20-4-05	6¼%	T135
Central Stores, Ld.......................... Do. (Founders')............	—	$91,845	6,000 123	$15 $15	$12 $12				Final of 60 cents making $1.80 for 04.. None..	30-3-05 —	12 % —	$15 $100
Do. (New Issue)................	1904	$360,000	24,000	$15	$7½	$20,000	..........$1,502	31-12-04	Preferential of 7% for '04............	30-3-05	7½%	$7
Hongkong Hotel Co., Ld.	1866	$600,000	12,000	$50	$50	*r* $648,975 $31,087	.........$10,126	30-6-05	$5 for first half-year 1905..............	4-9-05	6¾%	$147 buyers
Hongkong Land Investment and Agency Co., Ld.	1889	$5,000,000	50,000	$100	$100	*e* $250,000	.........$37,875	31-12-04	Interim $3½ for 1905....................	27-7-05	5½%	$128 sellers
Hotel des Colonies Co., Ld. (Shanghai)	1902	T225,000	9,000	T25	T25	*n* T20,986	.... T7,202	31-3-05	T2½ for the year ending 31-3-05.....	18-5-05	14 %	T18 sales
Hotel Metropole Company, Limited	1904	$200,000	2,000	$100	$100	—	........First	year	Interim of $4..............................	26-1-05	...	$105 sellers
Humphreys' Estate & Finance Co., Ld.	1887	$1,500,000	150,000	$10	$10	*i* $200,994 *e* $50,000	.........$11,958	31-12-04	90 cents for '04..........................	11-2-05	7¼%	$12½ buyers
Kowloon Land and Building Co., Ld. ..	1889	$300,000	6,000	$50	$30	none	.... $377	31-12-04	$3 for '04.....................................	31-1-05	7½%	$40 buyers
Shanghai Land Investment Co., Ld......	1901	T2,600,000	52,000	T50	T50	T828,813 *e* T170,000	.........T40,066	31-12-04	Interim of T3 for '05..................	21-7-05	6¾%	T122 sellers
Tientsin Hotel des Colonies, Ld.	1903	T70,000	1,400	T50	T50	none	.... T670	31-12-04	Interim of T3 for '05.............. ...	4-7-05	12 %	T45
Tientsin Land Investment Co., Ld.......	1902	T772,600	7,726	T100	T100	*i* T67,300	.... T725	31-12-04	Interim of T3 for '05..................	2-8-05	6 %	T117½ buyers
Wei-hai-wei Land and Building Co., Ld.	1899	T91,850	3,764	T25	T25	none	T687	31-12-04	None	—	—	T12
West Point Building Co., Ld.	1889	$625,000	12,500	$50	$50	none	..........$1,247	31-12-04	Interim of $1¾ for '05..................	27-7-05	6¾%	$55
Cotton Mills.												
Ewo Cotton Spinning and Weaving Co., Ld.	1895	T750,000	15,000	T50	T50	none	.........T12,844	31-10-04	T4 for year ended 31-10-03............	22-12-03	8 %	T52½ sales
Hongkong Cotton Spinning, Weaving and Dyeing Co., Ld...................	1901	$1,250,000	125,000	$10	$10	*e* $30,000	.........$23,264	31-7-05	$1 for year ended 31-7-05..............	4-9-05	7 %	$14½ sellers
International Cotton Manufacturing Co., Ld.	1895	T750,000	(5) 10,000	T75	T75	T50,000 *n* T31,669	.........T13,629	30-9-04	Interim of 3% a/c 1898.................	30-4-98	—	T44 buyers
Laou-kung-mow Cotton Spinning & Weaving Co., Ld.	1895	T800,000	(6) 8,000	T100	T100	none	.........T10,000	31-12-04	Interim of 4% a/c 1898 on 6,000 shares	1-8-98	—	T59 buyers
Soey Chee Cotton Spinning Co., Ld.....	1895	T1,000,000	2,000	T500	T500	*l* T5,658	.........T22,051	31-12-04	4% for 1897....................................	2-2-98	—	T260 buyers
Miscellaneous.												
Anglo German Brewing Co., Ltd.	1905	$100,000	4,000	$100	$100	—	—	—	First year..	—	—	$105
Bell's Asbestos Eastern Agency, Ld......	1895	£5,377.10s	8,604	12/6	12/6	£314	.............£770	31-12-04	1/3 per share for '04......................	21-7-05	9¾%	$7 buyers
Campbell, Moore & Co., Ld................	1886	$12,000	1,200	$10	$10	$8,000	.... $1,182	31-12-04	$3 for 1904	1-4-05	8¾%	$36
China-Borneo Co., Ld.......................	1903	$720,000	(7) 60,000	$12	$12	none	—	31-12-04	$1 for 1904	17-3-05	8½%	$11¾
China Flour Mill Co., Ld.	—	T200,000	4,000	T50	T50	T30,000	..............T718	31-12-04	Interim of T5 for 1905	24-7-05	8½%	T77½ sellers
China Light and Power Co., Ld.	1901	$500,000	50,000	$10	$10	none	..........$3,739	29-2-04	None	—	—	$10
China Provident Loan and Mortgage Co., Ld.	1898	*a* $1,000,000	100,000	$10	$10	$80,000	...........$1,581	31-12-04	80 cents for 1904........................	18-1-05	9 %	$9 buyers
Dairy Farm Company, Ld...................	1896	$187,500	25,000	$7½	$6	—	—	31-7-04	$1¼ for year ending 31-7-03..........	20-11-03	—	$17¼

STOCKS	WHEN ESTAB-LISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation*	CLOSING QUOTATIONS
											PER CENT	
Miscellaneous.—Continued												
Green Island Cement Co., Ld.	1889	$1,500,000	150,000	$10	$10	p $400,000 $500,000	$95,054	31-12-04	$2 for 1904	27-2-05	7 %	$28
Hall & Holtz, Ld.	—	$420,000	(8) 21,000	$20	$20	$186,000	$7,551	29-2-05	Final of $1½ making $2½	15-4-05	9¼%	$27
Hongkong and China Gas Co., Ld.	1864	£70,000	7,000	£10	£10	f £25,394 £3,000	£8,188	31-12-04	Final of 6% & bonus of 1% making 22s. for 1904	25-5-05	7 %	$175 buyers
Hongkong Electric Co., Ld.	1889 1899	$600,000	30,000 30,000	$10 $10	$10 $5	none	$2,151	30-4-05	$1.00 / 50 cents for year ending 30-4-05	17-7-05	6¾% 5¼%	$15¼ buyers $9¼ buyers
Hongkong High-Level Tramways Co., Ld.	1887	$125,000	1,250	$100	$100	$50,000	$2,796	30-11-04	$15 for year ending 30-11-04	24-12-04	7 %	$215 buyers
Hongkong Ice Company, Ld.	1881	$125,000	5,000	$25	$25	k $60,000	$5,356	31-12-04	Interim of $4 for 1905	2-8-05	7 %	$237½ sellers
H'kong Rope Manufacturing Co., Ld.	1883	$500,000	10,000	$50	$50	$60,000	$11,137	31-12-04	$10 for 1904	10-4-05	7 %	$152 buyers
Hongkong Steam Waterboat Co., Ld.	1900	$150,000	15,000	$10	$10	$2,500	$299	30-9-04	Interim of 50 cents for half year ended 31-3-1905	3-6-05	13¾%	$14 sellers
Lane, Crawford & Co., Ld. (Shanghai).	1903	$250,000	2,500	$100	$100	none	$42,009	29-2-05	Final of $9 making $14 for 1904	19-4-05	9½%	$145 buyers
Maatschappij tot Mijn-, Bosch- en Landbouwexploitatie in Langkat	1902	G.2,500,000	25,000	G.100	G.100	T528,210 T19,465	T35,849	31-10-04	3rd quarterly dividend of T2½ making so far T15 for '05	15-9-05	—	T240 buyers
Mondon, (E. L.) Ld.	1902	T350,000	7,000	T50	T50	none	Dr. T117,638	31-12-04	T5 for 1902	2-5-03	—	T25
Philippine Company, Ld.	1904	$675,000	67,500	$10	$10	—	—	—	First year	—	—	$8 nominal
Shanghai and Hongkong Dyeing and Cleaning Co., Ld.	1903	$60,000	1,200	$50	$50	none	Dr. $5,537	31-8-04	None	—	—	$50
Shanghai Gas Co., Ld.	1903	T800,000	16,000	T50	T50	d T145,000 T108,172	T8,011	31-12-04	Interim of T3½ for 1905	26-7-05	7 %	T123½ sales
Shanghai Horse Bazaar Co., Ld.	1904	T270,000	5,400	T50	T50	T45,000	T9,751	31-12-04	T6 for 1904	17-3-05	7½%	T80 sellers
Shanghai Pulp and Paper Co., Ld.	—	T450,000	4,500	T100	T100	T25,000	T6,968	31-12-04	Interim of T6 for 1905	22-7-05	9 %	T150 sellers
Shanghai Sumatra Tobacco Co., Ld.	1902	T600,000	(9) 30,000	T20	T20	w T24,820 T25,000	T1,297	31-10-04	Final of T6 making T9	8-3-05	13½%	T68
Shanghai Waterworks Co., Ld.	1881	£144,000	7,200	£20	£20	T170,000	T17,220	31-12-04	Interim of 15/- for 1905	27-7-05	4½%	T440 buyers
South China Morning Post, Ld.	1903	$150,000	6,000	$25	$25	none	Dr. $5,068	29-2-05	None	—	—	$20
Steam Laundry Co., Ld.	1902	$75,000	15,000	$5	$5	none	$3,644	31-5-04	60 cents for year ended 31-5-04	2-8-04	7½%	$8
Straits Ice Company, Ld.	1884	$200,000	2,000	$100	$100	$25,000	$700	31-12-04	$5 account 1905	...-2-05	—	$150
Tientsin Waterworks Co., Ld.	1901	T. T200,000	2,000	T. T100	T. T100	e T15,259 T4,000	T1,012	30-4-05	Final of T4½ making T8½ for '04/5.	17-6-05	7 %	T. T120
United Asbestos Oriental Agency, Ld. Do. do. (Founders')	1896	$100,000	9,900 100	$10 $10	$4 $10	$22,000	$551	31-5-05	80 cents / $19.80 for year ended 31-5-05	29-7-05	9 % 11 %	$9 buyers $180
Watson (A. S.) & Co., Ld.	1886	$900,000	90,000	$10	$10	$300,000 $25,000	$6,096	31-12-04	Final of 50 cents making $1 for '04.	29-5-05	7 %	$14½ sales
William Powell, Ld.	1901	$150,000	15,000	$10	$10	e $4,500	$676	30-6-05	Final of 70 cents making $1.20 for year	2-10-05	10½%	$11½ ex div.

LOANS AND DEBENTURES	AGENTS FOR THE LOAN	AMOUNT OF LOAN	PAR VALUE	OUT-STAND'G BONDS	WHEN PAYABLE	CLOSING QUOTATIONS
China Government, 7 per cent. Silver Loan 1886 E.	Hongkong & Shanghai Bkg. Cor.	T767,200	T250	1969	Mar. 31st & Sept. 30th each year until Mar. 31st, 1917.	par. Plus accrued interest
Hongkong Hotel Co., Ltd., 6% Mortgage Debentures of 1899‡	Hongkong & Shanghai Bkg. Cor.	$500,000	$500	§ all	Half yearly, June 30th and December 31st	par. Plus accrued interest
Shanghai & Hongkew Wharf Company, Ltd. 6% Debentures of 1902	Hongkong & Shanghai Bkg. Cor.	T543,900	T100		Half yearly, June 30th and December 31st	T97 Plus accrued interest
Astor House Hotel Co., Ltd. 8% Debentures of 1903	Hongkong & Shanghai Bkg. Cor.	T500,000	T100		Half yearly, January 1st and July 1st	T105 Plus accrued interest
Chinese Engineering & Mining Co., Ltd., 6% Debentures of 1903†		£500,000	¶	£480,000	Half yearly, June 30th and December 31st	par. Plus accrued interest
International Cotton Manufacturing Co., Ltd. 6% Debentures of 1901	Russo Chin. B.	T500,000	T100		Half yearly, March 31st and September 30th	par. Plus accrued interest

a Authorized capital $2,000,000
b Building Reserve Account.
c Capital Reserve Fund.
d Depreciation Fund.
e Equalization of Dividend Fund.
f Exchange and Investment Fluctuation Account.
g Gold Reserve Fund
h Exchange Reserve Account.
i Insurance Fund.
j Reinsurance Fund.
c Contingencies Account
l Legal Reserve Fund.
m
n Sinking Fund.
o
p Premium on New Issue.
q
r Repairs and Renewals Account.
s Silver Reserve Fund.
t
u Underwriting Suspense Account.
v
w Special works Fund.
x Extra Reserve Fund.
y 75,000 owned by the Company.
z 6,000 shares unissued.
1 5,725 shares unissued.
2 First issue of 60,000 of which 10,411 unallotted.
3 785 shares unissued.
4 7,600 shares unissued.
5 1,616 shares unallotted.
6 842 shares unallotted.
7 14,000 shares unissued
8 399 shares unissued.
9 Only 13,000 shares issued.
* Based on last year's dividend.
§ 268 held by the Company.
¶ In certificates of £20 and £100
‡ Redeemable in 10 years, or at option of Company the Company giving 6 months' notice.
† Redeemable at par at rate of £10,000 per annum from 31st December, 1903 to 31st December, 1952
Dr. Deficit.

SINGAPORE SHARE QUOTATIONS.

Courtesy Messrs. Fraser & Co., Brokers, Singapore, October, 1905.

NAME	DATE OF FOR-MATION	CAPITAL	CAPITAL PAID UP	NO. OF SHARES	ISSUE VALUE	PAID UP	RESERVE	LAST DIVIDEND	SINCE LAST MAIL HIGHEST	SINCE LAST MAIL LOWEST	CLOSING QUOTATIONS
Mining.									$	$	$
Bersawah Gold Mining Co., Ld.	1900	$175,000	115,000	13,500 [1]	10	10					12.00 sellers
" " " " *Deferred.*				4,000	10	10					8.00 sellers
Bruseh Hydraulic Tin Mining Co., Ld.	1901	$600,000	600,000	60,000	10	10					6.50 buyers
Kadana Gold Mining Co., Ld.	1901	$300,000	300,000	20,000	10	10					2.00 sellers
" " " " *Pref.*				10,000	10	10					10.00 nominal
Kechau Goldfields, Ld. *Fully paid*	1902	£30,000	16,175.7/-	6,207	1	1					6.00 sellers
" " " *Contrib.*				23,793 [2]	1	19/-			5.50	4.50	4.50 sellers
Pahang Corporation Ld.	1889	£250,000	244,306	244,306	1	1	20,000	3 per cent for year ending 30-6-02			3.50 sellers
Pahang Kabang Ld.	1890	£375,000	375,000	360,000	1	1			0.70	0.60	0.60 sellers
" " " *Pref.*				15,000	1	1					...... nom.
Queensland Raub G. M. Co., Ld. *Fully paid*	1901	£146,700	100,866	36,700	1	1					...... nom.
" " " " *Contrib.*				110,000	1	11/8					0.30 sellers
Raub Aust. Gold Ming. Co., Ld. *Fully paid*	1892	£200,000	191,250	50,000	1	1	4,873	1s. paid January, '01			5.00 nom.
" " " " *Contrib.*				150,000	1	18/10		1s. " " "			4.75 buyers
Redjang Lebong Mining Co.	1898	f.2,000,000	1,800,000	20,000 [3]	100	100		22 9-10% for year ending 31-12-04	345.00	340.00	345.00 buyers
Royal Johore Tin Mining Co., Ld.	1900	$220,000	220,000	22,000	10	10		5 " for year ending 15-2-04			3.25 sellers
Sipiau Tin Co., Ld.	1899	$230,000	230,000	23,000	10	10		5 " for ½ year ending 30-6-03			5.25 buyers
The Belat Tin Mining Co., Ld.	1903	$300,000	300,000	30,000	10	10					6.00 sellers
Tronoh Mines, Ld.	1902	£160,000	149,185	160,000 [5]	1	1		5/6 paid during 1905	20.75	20.25	20.25 sales
Duff Development Co., Ld.	1903	£400,000	350,000	400,000 [6]	1	1					8.50 sellers
Rubber.											
Bukit Rajah Rubber Co.	1903	£70,000	61,000	70,000 [13]	1						£3.0s. od. ......
Balgownie Rubber Estate Ltd.	1905	$200,000	100,000	20,000	10	5					$6.50 sellers
Cicely Rubber Estates Co.	1904	£12,000	10,500	6,000	1						£1.13s. 6d.
" " " 5% Pref.				6,000 [14]	1						£1.15s. od. ......
Pataling Rubber Estate Syndicate	1903	£30,000	17,500	30,000 [15]	1	1					£2.15s. od. ......
Ribu Planting Co. Ld.	1904	$200,000	135,000	2,000 [16]	100	100					$160.00 sellers
Sandycroft Rubber Co.	1904	$100,000	85,000	1,000 [17]	100	100					$125.00 buyer.
Selangor Rubber Co. Ltd.	1898	£30,000	26,000	30,000 [18]	1	1					£6.10s. od. ......
Singapore & Johore Rubber Co. Ld.	1903	$100,000	78,750	150	100	100					$100.00
" " " " " " *Contrib.*				850	100	75					75.00 ......
Sungei Way Rubber Co. *Fully paid*	1904	£50,000	13,920	6,920	1	1					£2 0s. od. sellers
" " " " *Contrib.*				35,000 [19]	1	4/-					17.00 sellers
Vallambrosa Rubber Co.	1904	£60,000	50,000	60,000	1						£2.17s 6d ......
General.											
Fraser & Neave, Ld.	1898	$225,000	225,000	4,500	50	50	112,500	10 p. ct. and 2½ per cent bonus for '04			102.00 buyers
Hogan & Co., Ld.	1904	$480,200	334,800	3,348	100	100	5,000	7 per cent March 1905	77.50	70.00	70.00 sellers
H'kong and Shanghai Banking Corporation	1865	£10,000,000	10,000,000	80,000	125	125	10,000,000 [9] 8,500,000 250,000 [10]	35s. for ½ year ending 30-6-05			900.00 ......
Howarth Erskine, Ld.	1901	$1,200,000	1,200,000	12,000	100	100	275,000	10% and 5% bon. for yr. end. 30-6-05			230.00 ......
Maynard & Co., Ld.	1901	$34,000	34,000	3,400	10	10		20 per cent for year ending 31-10-04			23.00 sellers
Riley, Hargreaves & Co., Ld.	1899	$875,000	875,000	6,000	100	100	150,000	10 p. ct. and 2½ p. ct. bon. for year '04	200.00	195.00	200.00 sales
" " " 7% Pref.				2,750	100	100		7 p. ct. for year 1904			115.00 buyers
Singapore Cold Storage Co., Ltd.	1903	$600,000	240,000	24,000 [4]	10	10					9.00 sellers
Singapore Dispensary Ld.	1891	$30,000	30,000	600	50	50	19,000	12½ per cent for year ending 31-7-04			77.50 buyers
Straits Ice Co., Ld.	1884	$200,000	200,000	2,000	100	100	22,000	5 " interim for 1905			150.00 buyers
Straits Steam Ship Co., Ld.	1890	$500,000	421,500	5,000 [7]	100	100	400,000 169,228 [11]	5 p. ct. interim for 1905			142.50 buyers
Straits Trading Co., Ld.	1887	$3,000,000	2,500,000	300,000 [8]	10	10	700,000 1,021,395 [12]	10 p.ct. & 50cts. bon. ½ yr. end. 31-3-05	43.00	41.50	41.50 sales
Tanjong Pagar Dock Co., Ld.	1864	$3,700,000	3,700,000	37,000	100	100	1,950,000	$20 for half year ending 31-12-04	500.00	425.00	500.00 sales
Debentures. $											
Howarth Erskine Ld. 7 per cent ... 250,000											3 per cent prem.
Singapore Municipal 6 " ... 400,000											... " nominal
" " 5 " ... 1,878,000											2 " prem. buyers
" " 4 " ... 602,300											2 " dis. nominal
Riley, Hargreaves & Co., Ld. 6 p. cent 225,000											3 " prem. buyers
Tanjong Pagar Dock Co., Ld. 6 " 250,000											2 " prem. nom.
" " " " 5 " 1,365,500											prem. sales

1 3,500 unissued. 2 13,300 " 3 2,000 "
4 36,000 unissued. 5 10,815 " 6 50,000
7 785 unissued. 8 50,000 " 9 Special Gold Reserve Fund.
10 Insurance Fund. 11 Sundry Reserves. 12 Sundry Reserves.
13 9,000 unissued. 14 1,500 " 15 12,500 " Mortgage £5,000
16 650 unissued. 17 150 " 18 4,000 " 19 8,080 "

THE FAR EASTERN REVIEW

COMMERCE ⊛ ENGINEERING ⊛ FINANCE

VOL. II. MANILA, P. I., AND SHANGHAI, NOVEMBER, 1905. No. 6.

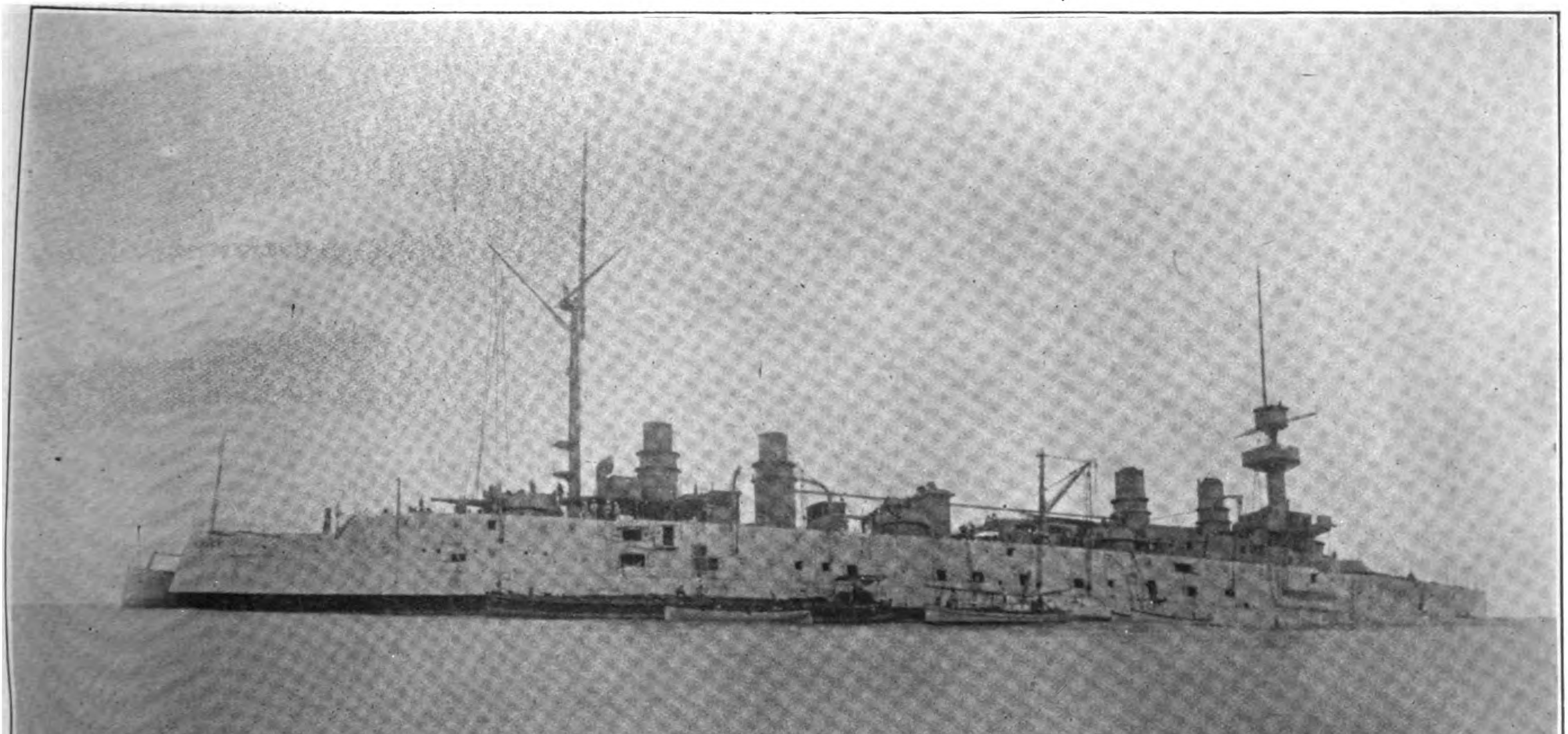
NOVEL ENGINEERING EFFORT TO SALVE THE FRENCH CRUISER "SULLY"

In a recent excellent supplement to its daily edition, the enterprising *Hongkong Telegraph* announced that the great French cruiser *Sully*, which lay on the rocks in Along Bay, off the Tonkin Coast, had become a total wreck necessitating the abandonment of further salvage operations which had been undertaken by a syndicate of Hongkong capitalists under authorization of the French Government. From the date of the stranding of the giant warship until the abandonment of the attempt to salve her, great interest in the novel engineering features involved prevailed everywhere in marine circles throughout the Far East. In view of this fact THE FAR EASTERN REVIEW, with the kind assistance of Mr. E. A. Snewin, editor of the *Hongkong Telegraph*, has gathered for its readers some highly interesting unpublished photographs of the wreck.

For eight months the cruiser *Sully* lay on the rocks in Along Bay withstanding the force of sea and wind. She was built at La Seyne in 1901 at a cost of £954,536, and was an armoured cruiser. Her displacement was 10,014 tons. She had an indicated h. p. of 20,500, capable of attaining a speed of 21 knots, and carried a complement of 615 men. She came to the Orient a few months before her accident in Along Bay, and was regarded as a powerful and well-built vessel. Disaster befell her early in February, 1905.

CAUSE OF THE ACCIDENT.—At the court-martial held on board *Montcalm*, Commander Guiberteau was acquitted of all blame in connection with the disaster, and the accident was directly attributed to the defective and unsatisfactory hydrographic survey of the coast of Indo-China. When the accident occurred *Sully* was engaged in target practice, and was carrying out maneuvers in waters which had already been traversed by *Gueydon*. The latter completed her maneuvres in safety, but *Sully* was not so fortunate. She crashed onto the rocks when going at a speed of 11 knots, and remained fixed there. She sustained very considerable damage, and when, shortly afterwards, a representative of *L'Avenir du Tonkin* visited her, he found the ship resting like "some giant animal mortally wounded to the heart and in agony." She was lying on one side, with her bow deeply sunk in the shoal. Great part of the ordnance on board had been transferred to another vessel, which had been engaged for the work of relieving the strain on the decks, and a number of sailors had also left *Sully*, with the view of lightening the burden on the cruiser. The operations of removing the cannon were of an exceedingly difficult and dangerous character, especially as a high sea was running, but after much trouble the transfer was safely accomplished. Several of the guns on the upper deck remained aboard the cruiser, for the simple reason that it was considered impossible to get them off without herculean efforts. The impression of the writer was that the work of saving *Sully* would be an exceedingly difficult task, and he added that only those who had been on the spot could realize the condition of the warship. It was estimated that the cruiser lay 120 meters from the Canot Rock. There were 12 meters of water in the fore part of the vessel, and all the machinery was practically destroyed. The most alarming feature as to the possibility of saving her was the fact that she was balanced on the reef in a most unstable position. Soundings were taken, and it was found that the water was 18 meters deep on one side and 5 meters on the other, the vessel lying at an angle of 8 degrees. The saving of the ship depended entirely upon the wind and tide—whether she was broken by bumping on the rock or capsized by the force of wind and waves. If the wind remained calm and the water smooth it was thought that Admiral Bayle might succeed with help in getting *Sully* safe off the reef.

(Continued on page 142.)



CRUISER *SULLY* ON THE REEF IN ALONG BAY, PHOTOGRAPHED SHORTLY AFTER THE ACCIDENT.

THE FAR EASTERN REVIEW

COMMERCE :-: ENGINEERING :-: FINANCE

A MONTHLY REVIEW OF FAR EASTERN TRADE, FINANCE, AND ENGINEERING. DEDICATED TO THE INDUSTRIAL DEVELOPMENT AND ADVANCEMENT OF TRADE IN THE PHILIPPINES AND FAR EASTERN COUNTRIES.

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MANILA AND SHANGHAI, NOVEMBER, 1905

THE PHILIPPINE TARIFF COMMITTEE

Governor-General Luke E. Wright; Commissioner W. Cameron Forbes, Secretary of Commerce and Police; Dr. W. C. Welborn, Chief of the Bureau of Agriculture; Mr. George Bronson Rea, publisher and editor of THE FAR EASTERN REVIEW, and Sr. D. Esteban de la Rama, of Iloilo, the last-named gentleman representing the native sugar planters, have sailed for the United States to work for more favorable congressional legislation at Washington for these possessions. Governor-General Wright and Commissioner Forbes expect to be present at the national capital when bids for the construction of railroads in the Philippines, under concessionary contract with the government, are opened there, after which the Governor-General will devote his energies to the successful outcome of our efforts for free trade with the home country. Dr. Welborn, Mr. Rea, and Sr. de la Rama will coöperate with him in this fight.

Indications are that the fight for absolute free trade will be bitterly opposed as applied to tobacco and sugar. There is practically no opposition to the free entry of other products on a reciprocal basis, but the big tobacco and sugar trusts of the homeland have again come to the fore with powerful opposition to free entry for these products, or even a reduction of the duties which are now in force. Therefore, while our friends hope that free trade may include tobacco and sugar, there seems to be a growing opinion here and in Washington that if the committee succeeds in getting the present prohibitory tariff reduced to 25 per cent of the Dingley rates, it will have accomplished most satisfactory results.

The cause of the Philippines has been gaining many friends during the last four months among the legislators at Washington.. Those congressmen, who came to the Islands with Secretary Taft and saw for themselves the truly deplorable condition of our agriculture, can not help but be convinced that we need the tariff concessions which we are seeking from the American people. Certainly some of them will line up with the trusts in spite of justice and fair play, because they are trust legislators and would never come over to our side. Such a change of front would mean their political downfall. To save their political "face" they must stick to the trusts. With them fair play for the Philippines is an unknown quantity. They did not come to the Islands for an impartial personal survey of our internal conditions. They came here to better fortify the opposition against our demands. These antagonists, however, were a large minority in the personnel of the Taft party. The fair-minded, unpledged majority were won over to our cause in the face of strong influences by the justice of our appeal. They will be in Washington to help the committee, also, in its fight. In view of this important gain to our interests, and with the influence of the President and the Secretary of War on our side, our prospects of success are very bright to say the least.

Of the two products—tobacco and sugar—the hardest fight will be on sugar. The cane and beet growers of the homeland, backed by Havemeyer and the Oxnard clique, are the "calamity howlers" against our product. Thus far they have been able to destroy our efforts, because, by the subtle distortion of facts and figures with reference to the possibilities of the sugar industry in the Islands under the impetus of capital and modern machinery, and by the lack of technical advice on our part to refute their arguments against the industry, they have practically had everything at Washington their own way. Mr. Rea will, in all probability, lead the fight for sugar. He is an expert sugar engineer, with years of experience in Cuba, and good knowledge of the methods of the trusts, and he is going to Washington armed with an enormous amount of valuable and convincing data which he has gathered in the Islands to present at the committee hearings. Besides, he will have the experienced coöperation of the Chief of the Agricultural Bureau, and of Sr. de la Rama, in addition to which labors Dr. Welborn will lead the fight for the tobacco interests. It is safe to assume, however, that the success of the fight for sugar will carry with it success for the tobacco interests.

We believe Governor-General Wright is taking to Washington a tariff committee that will safeguard our interests. It only remains for congress to give us fair play, and our fight will succeed. The American people always have insisted on right and justice in their domestic and foreign policies. Let us hope, therefore, that they will not fail us in this our time of great need. They owe us their friendship first of all for humanity's sake. They must help us revive our agriculture, our industries, and our commerce with even more sincerity than they have thus far shown in their efforts to improve the political and social condition of the Filipinos, which have for their ultimate object a government in the Islands of the people for the people and by the people.

THE CANTON-HANKOW RAILWAY.

In view of the fact that the colonial government of Hongkong has undertaken to advance the money to the Chinese for the redemption by the latter of the Canton-Hankow Railway concession from the American syndicate, much interest centers just now in the ultimate outcome of the deal. One of the most important of the latest phases of the transaction is the decision of the government council at Peking that no foreign loan will be allowed in the redemption of the concession, and that the British aid must be withdrawn. This ruling in the face of the fact that the loan was closed and the first payment made by the Hongkong Government before the publication of the Peking protest, seems likely to bring about complications between the British interests and the Peking Government which may not be settled in a day.

There seems to be little doubt but that China was entirely justified in cancelling the American concession and demanding the restoration of the railway, etc., to the Chinese. In 1898, China granted a concession to the American-China Development Company, which provided for the construction of an 800-m. trunk-line railway from Hankow to Canton. The concession, which involved coal-mining rights and industrial franchises, was to run for 45 yrs., at the end of which period the property was to go to the Chinese Government. The proposed line is the southern extension of the Belgian road from Peking to Hankow, and forms part of a great transportation route leading directly through the heart and commercial center of China. The company, however, built only about 30 of the 800 ms., but surveyed 100 ms. more. Then the Americans flagrantly violated the terms of their agreement by secretly selling out their interests to the Belgians, among whom King Leopold was the moving spirit. When this transfer became known to China she entered a most vigorous protest against the deal and demanded the return of the concession by the American Government. King Leopold advised J. Pierpont Morgan, the latest head of the American syndicate, not to listen to the demand of the Chinese Government, but President Roosevelt told the New York financier what he thought about the deal, and this brought the Americans to thaw. At a meeting of the stockholders of the American-China Development Company, August 9th last, it was decided to cancel the deal with the Belgians, and with the consent and advice of President Roosevelt to return the concession to the Chinese for $6,750,000 gold, which arrangement the Peking authorities accepted.

Thus we have the financial interest in the Canton-Hankow Railway transferred by the Americans to the Belgians without the knowledge or consent of the Chinese; by the Belgians back to the Americans as the result of Chinese protest; by the Americans ostensibly to the Chinese through cancellation of the concession, but in reality by the Americans to the financial control of the British Government of Hongkong. In this connection it is interesting to note the remarks on this phase of the transaction made by the Hon. Mr. Gershom Stewart, chairman of the Hongkong branch of the China Association, at its annual general meeting on October 25th. Leading up to the Canton-Hankow Railway concession, by reference to the ending of the Russo-Japanese war, the chairman said:

"And it looks as if we are profiting by the occasion, as witness the new loan by the Hongkong Government to buy the Americans and Belgians out of the Canton-Hankow Railway. In common with every British subject in China we have reason to rejoice at the forethought which conceived and the wisdom which carried out this bold stroke. Although delay may be tedious and although we may suffer often from hope deferred, we have before us an infinitely brighter prospect than we have had in China ever since the construction of the Siberian Railway, which, with its implied absorption of the N. of China by Russia, hung like a thundercloud over the heads of home capitalists contemplating investments out here. That we have maintained our position as well as we have done is due largely to the tenacity and energy of individual British traders at various ports in China and to the yeomen service which has often been rendered by various consuls, and to the capacity of our minister at present at Peking."

To all intents and purposes American interests in China have been stripped of a most important impetus to their commercial expansion, and this loss has been the Britishers' gain. Hon. Edward H. Conger, former minister to China, is reported to have opposed the sale, on the ground that the surrender of the concession would be a serious blow to American interests in China, and that American prestige would suffer. But, according to *The Literary Digest*, in a statement from Oyster Bay it was said that it was the wisest plan which could be devised touching our national interests in the Far East, and that Mr. Morgan had adopted the only course "which he could take with due regard for the interests of the stockholders he represented."

Another reason for the sale was to the effect "that the Chinese Government has decided to force all American and European interests out of China, and that under these conditions further development of the concession would be difficult and unprofitable, if not impossible."

But this latter conclusion seems to be far-fetched because we find the Chinese, who are most interested in the completion of the railway, borrowing money from the British, with which to buy back the concession. And we feel like heartily complimenting our friends of Hongkong on the apparently successful outcome of their *coup*, which practically gives them control of the most important trade center of China. The American papers may try to explain away the unsavory conduct of the New York capitalists in handling the concession, by trying to attribute the redemption by the Chinese to hatred of the "foreign devil," the boycott, or the combination of the Chinese to force American and European interests out of China, but the cold fact remains that had it not been for the juggling of the concession between the Americans and the Belgians the former would have been in peaceful possession of the property today. Witness how readily the Chinese accepted offer of financial assistance from the Hongkong Colony. Does this look like an anti-foreign demonstration?

Some American papers have contended that grave political significance attached to the transfer of the concession by the Americans to the Belgians. We don't believe this in so far as it relates to the Americans. Probably the Belgians were dickering for political as well as commercial gain, but the Americans simply negotiated with Leopold because there were dollars to be made. Washington was never consulted. Had this been done there is little doubt but that the Canton-Hankow Railway would still be under American control, instead of British. Morgan and his clique simply betrayed American commercial interests in China into other hands for the sake of a little more money.

COMMERCIAL ATTACHES

In a recent issue of THE FAR EASTERN REVIEW we had occasion to mention the work of Mr. J. W. Jamieson, commercial attaché to His Britannic Majesty's legation at Peking, and point out the high order of the reports and information to his government.

Mr. Jamieson has since been honored with appointment to the Transvaal as special commissioner of Chinese labor, for a term of 2 yrs., for which post he is exceptionally qualified.

Mr. Jamieson's career in China reflects great credit on himself and redounds to the wisdom of his government in creating the post of commercial attaché, and his work stands as a model for other countries, particularly emphasizing the necessity of similar appointments. The trade development of China, at the present time, requires the most careful study and searching investigation by competent men, and the efforts of consuls should be supplemented by more complete and exhaustive reports.

A rumor has been current in Shanghai for some time that the American State Department has favorably considered this matter and the new post will be tendered to Mr. J. W. Davidson, recent vice consul general at Shanghai. We know of no one better qualified for this task than Mr. Davidson, whose long career in the Orient familiarity with his subject, keen perception and appreciation of affairs Chinese, and above all his established reputation as an authority and writer on Oriental subjects, places him in a class far above the ordinary aspirant for such a post.

The FAR EASTERN REVIEW would heartily endorse such an appointment as a just tribute to merit and worth, secure in the belief that the work would be intelligently and diligently prosecuted in manner beneficial to American interests and trade expansion.

OUR CONSULAR JUDICIARY

Under the law of all countries where there is ex-territorial jurisdiction, the consul acts judicially in all suits against his nationals, and in the administration of their estates; and by virtue of such jurisdiction, becomes both judge and jury and, as such, passes upon all questions of both law and fact in which the liberty, rights, and property of the American citizen are involved. The large and ever-increasing amounts involved in litigation *ad administration* certainly entitles American interests to the protection of a court presided over by a judge with at least the same qualifications as an official occupying a similar position at home. This matter has been taken up by a prominent American attorney of Shanghai, in a memorial to congress, through a certain United States senator, in the hope that the national legislative body at Washington will take some action to relieve the American consular service of this embarrassment by instituting necessary reform.

There has been much hue and cry about the "open door" and the building up of American trade in the Far East, and yet our government has provided no judicial machinery by which American property and American rights can be properly and adequately protected. In fact, there has apparently been no attention paid to the condition in which the American citizen is left, and he is compelled to worry along under the antiquated methods adopted in 1864 when China was practically a *terra incognita*, as if the people who were to build up this much-coveted trade were not worth considering by the home government. Consuls have usually been appointed for some political reason, and while as a rule they have been honest, intelligent officials, and energetic, we all know that a man's ability to successfully run any business, or even a state or country convention, does not necessarily imply either great legal learning or judicial temperament.

For a purely executive or business office a business man is always preferable, but when there is coupled with this the most important judicial functions, additional qualifications are required which no purely business man can possibly have. For illustration: Take the position occupied by the consul-general at Shanghai where there are nearly 1,000 Americans residing with business interests mounting into the millions of dollars, and see what a perfectly inconsistent position he is compelled to occupy. Under the American law he is both judge and jury, and under the consular rules and regulations, he is the adviser and sympathizer, and, to a certain extent, guardian of these 1,000 people, with their vast and varied commercial and financial interests. "A" gets into trouble. He makes straight for the consul-general, as he has the right to do, and pours into his sympathetic ear his tale of woe. It is the duty of the consul-general, under the rules and regulations, to hear and advise. When "A" departs, "B" appears to get the advice and assistance of the consul-general in downing that fellow "A," and the official must condole with and advise "B" as well. Within a week the consul-general may find himself sitting as both judge and jury in a case where one or maybe both of the parties have been acting under his advice. In short the official is compelled to do that for which as a judge he would be impeached in any state in the Union. Is it right that the American official, acting as judge of an American court, should be placed in this humiliating and inconsistent position? or that American citizens and American interests should be so handicapped?

We believe the American consular service has shown much ability and efficiency, but let the home government cease forcing its officials into the embarrassing and humiliating position of wet nurses for American interests and then command them to step out as unprejudiced and independent judges of the very interests they were commanded to nurse. It is not fair to the citizen nor just to the official that the government should strip its consular body of that money independence which unprejudiced and unbiased freedom of thought and action that characterizes the upright judge, and then set him up to pass upon the acts of the parties with whom he has acted as adviser. The law forces upon him the judicial functions and the rules and regulations clothe him with powers and duties which wholly unfit him for the position he occupies. To perform his judicial duties as they properly should be performed would force him to prove recreant to his duties as a consular official. To properly perform his consular duties, as required, and then to act as judge between the very parties, one of whom at least in almost every case he has been advising, is to make an honest man feel like a culprit in the court of his own conscience. It is enough to muddle a Marshall, and a mere statement of the conditions to which both the consular officials and citizens are subjected shocks every sense of judicial and professional propriety.

Owing to existing conditions petty matters must necessarily remain under consular management and control. To this nobody objects, but when it comes to the more important litigation and administration of estates, and the protection of the liberty and rights of a citizen, the American should not be left to feel that his government does not take sufficient interest in him even to provide the necessary judicial machinery abroad for his protection. There is a bill pending, prepared by the State Department, providing for a district court for China and Korea, with a judge at $8,000 *per annum*, a district attorney at $5,000, a clerk at $3,000 and a marshal at $3,000. This seems to us as a useless waste of money in view of the fact that there is apparently no necessity for anything but a judge, leaving the consular employees to act as a clerk and marshal, just as they do at present. The position of district attorney would indeed be a lazy man's job, as he would have nothing on earth to do but draw his salary. The judge should have a contingent fund of say $1,000 *per annum* with which to employ special counsel when necessary and ordinarily that sum would remain untouched at the end of the year. In this connection here are a few suggestions:

All police business and suits for petty sums should remain subject to the jurisdiction of the consuls as at present, with the right of appeal.

The judge should hold court at the various ports as the business required.

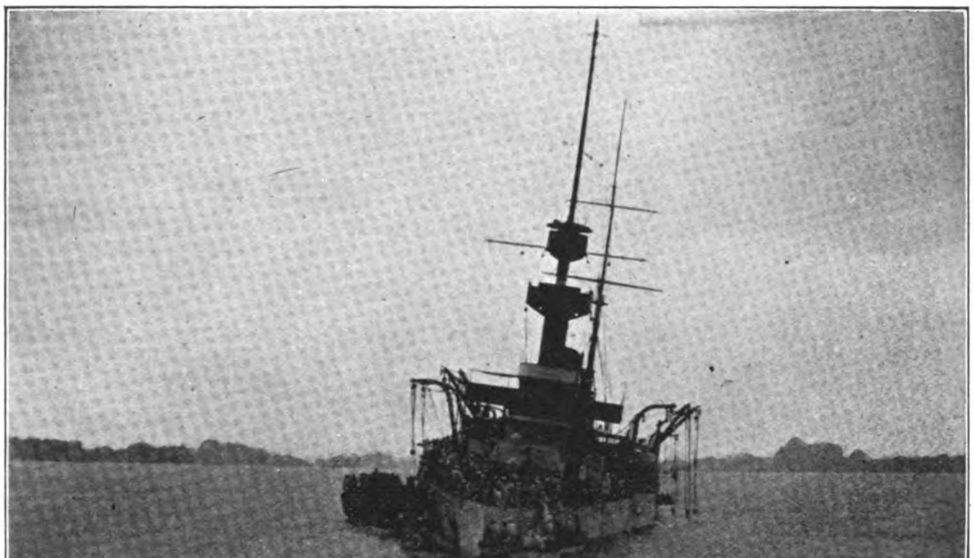
A clerk and marshal would be useless appendages and a waste of money, and the business would be better done to have consular employees act as at present.

The consul should, in the absence of the judge, issue all writs returnable before him and under rules prescribed by him.

The judge should, prepare a code of procedure to be approved by the minister, which should conform generally to that of the United States courts, and as simple as possible.

Clerks and marshals should receive small, if any, additional compensation.

The science of "squeeze" has been brought to perfection in China and the underlings of foreign officialdom soon learn how to apply the lever for all it is worth for their own benefit. The crying need is for a judge and the entire additional expense would not exceed $10,000 *per annum* if the useless appendages are eliminated. The judge alone is the only necessary requisite and would satisfy the Americans in China and adequately protect all personal and property interests. Fees—that constant source of graft and peculation—should all go to the government, as these minor officials are by no means overworked or underpaid. The judge should be a man of mature years, or learning, character, judicial temperament and established reputation. Give Americans out here this and these citizens in the Far East will feel as if they are not entirely ignored or forgotten by their own country—and to this they all feel they are entitled.



CREW LEAVING *SULLY* SHORTLY AFTER SHE STRANDED.

NOVEL ENGINEERING EFFORT TO SALVE THE FRENCH CRUISER "SULLY"

(Concluded from page 139.)

Extent of the Damage.—An examination of the stranded cruiser was subsequently made by divers who found that the hull had been cut open as if by scissors by numerous sharp points of the reef. There were two holes in the fore part, the chief rent being some 32 meters long and 25 centimeters wide, and was believed to continue within the inner skin. There was a fear at first of the cruiser capsizing, but later there was a greater fear of her breaking up as she was suspended amidships with a rent some 90 ft long in her bottom, the rock on which she was lying being only 75 ft. in length, while at the end she was overhung for a length of 174 ft. with nothing for support. Admiral Bayle realized the precarious position of the cruiser and ordered everything possible to be removed from her. The workmen were engaged in unbolting armour-plates from the cupolas and the turrets of the guns, of from 104 to 164.7 mm. In the 'tween-decks the greater part of the guns were quickly removed from the casemates. Coal was taken out of the bunkers, and everything possible done to lighten the ship. Meanwhile a large quantity of bricks and cement with which to patch up the hull of the disabled cruiser were transported to the scene of the operations, as well as a large quantity of timber.

Hongkong Salvage Syndicate.—Admiral Bayle engaged the services of the Hongkong Salvage Syndicate to help him raise *Sully*. Negotiations resulted in an agreement that 2,500 francs a day should be paid to the company until the floating of the ship, which, it was then expected, would be completed in fifteen days, while the whole job was reckoned to cost at something like 1,000,000 francs to her final flotation, this including towing to Hongkong where the repairs in dock were estimated to take at least six weeks. No time was lost in arranging about salvage operations, and on February 16th it was announced that the steamer *Hanoi* had been chartered by the Hongkong Salvage Syndicate who had secured the contract to salve the cruiser, and which left Hongkong that day with a surveying party, under Mr. J. Watt Jameson, for the purpose of making a preliminary inspection of *Sully* in order to determine the chances of salving the vessel, and deciding what course to pursue. On February 25th *Hanoi* returned to Hongkong for the purpose of obtaining further salvage gear, with supplies, and more men to do the diving and coolie work. Although bad weather was experienced the salvage party was enabled to get aboard *Sully* and examine her, and it ascertained that in consequence of the removal of so much of her armaments, gear, etc., the ship had considerably lightened and the salvage party did not anticipate that she would sustain any further damage, by bumping and grounding as was at first feared.

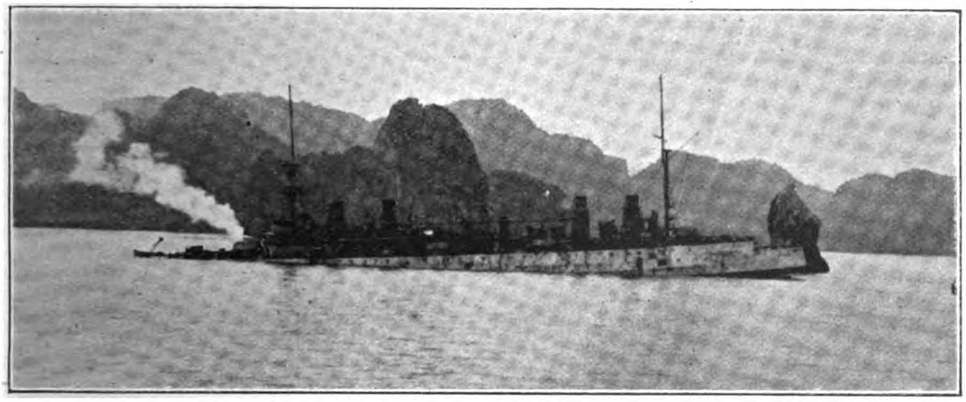
Despite every effort made the water in the forward part of the cruiser did not abate, and it was said that the leak was in such a position in the overhanging forward part of the vessel that with the water deep on the outside and several feet inside it could not be got at to be patched up. The operations had one beneficial effect, however, for they kept the vessel at an uniform weight, and so obviated in great measure the risk of her breaking up by grinding heavily on the rock on which she was perched. It was at this stage that Mr. Jameson retired from the operations, and on March 27th, Mr. W. C. Jack, of Messrs. E. C. Wilks & Co., took the matter in hand and proceeded on *Hongkong* to Along Bay to report on the position and condition of the vessel and on the possibilities there were of ultimately salving her.

New System Adopted.—In the event of it being found in any way possible to refloat the ship it was the intention of those responsible for the salvage of the vessel to commence operations under an entirely new, and, it was hoped, an almost infallible system. It was decided to build a huge cofferdam of some 4,500 tons displacement in order to raise the bow of *Sully*, clear her of water and thus get her off the rock. The proposition was telegraphed to the Minister of Marine in France, and was approved by him, and the contract was duly signed on April 11th. On the 14th of that month Mr. W. C. Jack returned to Hongkong in company with M. Edmond, Chief Constructor of the French naval arsenal and dock at Saigon, to supervise the construction of the pontoon the work upon which had been commenced by the Hongkong and Whampoa Dock Company at its yard in Kowloon on the receipt of telegraphic instructions. The company's technical and operative staff continued hard at work, both at the design and structure of the pontoon and had the satisfaction of seeing successfully launched a most unique and creditable piece of work.

Cofferdam Described.—A huge, unwieldy, coffin-shaped box cut in half, flat-ended, flat sided, and flat-bottomed—such was the first impression of the cofferdam as it lay on the slip. Rising to a height of 35 ft. and spanning 80 ft. at its broadest part, the cofferdam was by no means a beauty in appearance. Painted black all over, its funereal aspect was enhanced, and the strange uncouthness of the machine, or boat, or whatever it may be called, seemed to affect even the coolies who were working on the structure. It tapered from the 80 ft. end to about 40 ft. at what may be called the bows. It was more unshapely than a Chinese junk, and had none of the picturesqueness of the native craft. The bows were built up to a height of 35 ft., but the stern was open; it was a box with three sides only. At the open end the shape of *Sully* was hollowed out, gradually tapering away till at the bows of the cofferdam was the outline of the cruiser's bows. The idea, then, should be quite clear, even if the description is halting and vague. The cofferdam was to be towed to the Bay of Along, and worked under the cruiser until the bow of the vessel rested in the niche made for it in the cofferdam. Then the pumps were to be set in operation, and as the cofferdam rose, the fore part of *Sully* would rise with it, until the stranded cruiser was lifted clear off the rocks and slide once more into deep water.

Russian Officer's Suggestion.—The origin of the idea to construct a cofferdam forms an unusually piquant piece of modern history. It seems that the interned Russians at Kowloon have been following the efforts to refloat *Sully* with the greatest interest, so when it became known that the preliminary efforts of the salvage people to get the cruiser off the rocks had proved futile, a Russian officer at Kowloon came forward with his scheme. He produced plans of what might be termed an embryo cofferdam. So far as they went they were excellent—the idea was admirable. The more practical mind of an expert like Mr. W. C. Jack, who was assisted by M. Gaston Liebert, Consul for France at Hongkong, grasped the suggestion like shot. They saw the possibilities of the

COFFERDAM AND SHEERLEGS ALONGSIDE *SULLY*, THE FORMER READY TO BE PLACED IN POSITION. THESE SHEERLEGS COST THE FRENCH GOVERNMENT £1000, APART FROM THE BARGES UPON WHICH THEY WERE ERECTED.



LAST OF *SULLY* AFTER TYPHOON HAD BROKEN HER IN TWO. WHEN THIS PHOTO WAS TAKEN THE CRUISER WAS GRADUALLY SETTLING INTO DEEP WATER, THE COFFERDAM HAD BEEN DESTROYED AND FURTHER SALVING OPERATIONS WERE ABANDONED.

scheme and also that it required some modification here and a little elaboration there. Probably the cofferdam as it originally stood was utterly unlike the plan drawn by the Russian, but it expressed the outline of his originality.

LAUNCHING THE COFFERDAM.—The launching of the strange structure took place at the Kowloon Docks in the presence of the Hon. Sir Paul Chater, C.M.G., Chairman of the Hongkong and Whampoa Dock Company; Mr. W. B. Dixon, chief manager; Mr. W. Wilson, late manager of the Kowloon establishment, who has since taken over the chief managership *vice* Mr. Dixon absent on leave; Mons. G. Liebert, Mr. W. C. Jack, Mr. E. C. Wilks, Captain Owen Wilks, several shareholders and others. There was no delay whatever in the cofferdam taking the water and subsequently being towed alongside the wharf for a final touching before her long sea-journey to the Tonkin Coast. Mr. William Barker, electrical engineer, who is in charge of the electric department of Messrs. E. C. Wilks' business, fitted up an electric lighting plant, which was taken down to facilitate the salvage work, and enable the salvage operators to work in any required position, either above or below water. Being built entirely of wood, with the exception of the strengthening iron plates necessary to prepare her to withstand all conditions of weather and the strain of the work before her, and being thus very buoyant, the cofferdam was loaded with heavy cables along the sides in order to submerge her, besides having her tanks filled, as would be necessary to "put her down" to the level of her decks, only the air-tanks remaining above water.

A TYPHOON.—The British Admiralty, who had shown a desire to assist the French Naval Administration in raising *Sully*, offered the services of a British naval boat to tow the cofferdam to the Bay of Along, but the structure was taken down by the dock company's tugboat *Robert Cooke*, and the powerful tug, *Robert K.*, of the Atlantic, Gulf and Pacific Company. It arrived without mishap alongside the cruiser, and, shortly afterwards, on May 26th, an attempt was made to sink her beneath the stranded ship. But misfortune attended the effort and the huge structure capsized causing much additional work to be undertaken by the salvage experts, who, it should be said, had spared no pains to ensure success attending their mission, which for months past had been carried out in the face of great difficulties. The pontoon was again floated, and many improvements, necessitated by circumstances, having been effected on it, another attempt was to have been made at the end of August to sink it beneath the bows of *Sully*, which had already been raised several feet. Great hopes were entertained of refloating the cruiser, and just at the critical moment a typhoon swept over the bay doing irreparable damage to the pontoon. The falling barometer warned the salvage party of the storm, and every precaution was taken for *Sully's* safety. Nothing, however, could be done for the pontoon, and that unfortunately broke up and went practically to pieces, the debris, consisting of spars, beams, deckplanks and so on making a disappointing show of flotsam all around, while at least three of the pumps, with pipes, pig iron and chains, used as ballast, were lost by sinking in the break-up.

LAST OF THE CRUISER.—But these and many other mishaps notwithstanding, the salvage party believed that the ship could be got off the rock and successfully refloated, and to this end the crew visited Hongkong the first week in October and arrangements were made for shipping extra gear, dynamite and so on for blasting away the pinnacle on which the cruiser had for so long been balanced. The steamer *Kongnam* had been engaged in the operations in Along Bay for a long time, and after visiting Hongkong was to have returned to the scene of the wreck on Saturday, September 30th. In fact, she was on the point of starting when a telegram came from Mr. W. C. Jack announcing that during the recent typhoon *Sully* had become a total wreck, while later news stated that the afterpart of the ship had sunk in deep water. The cruiser was broben in twain, and now half lies on the rock and the other half is in 10 fathoms of water. The loss entailed by the breaking up of the cruiser together with the cost of salvage operations will be enormous. It is announced that the wreck will be sold at public auction about a month hence. Experts say it is questionable if it will bring £500.

MAMMOTH STEAMER "DAKOTA"

The Great Northern Steamship Company's immense steamship *Dakota*, sister ship of *Minnesota*, arrived in Hongkong October 26th, on her maiden voyage to the Orient. She is under the command of Captain E. Francke, a well-known Pacific Ocean master. *Dakota* shares with her sister ship the distinction of being the largest vessels ever constructed in the Western Hemisphere, and *Dakota*, being a few tons larger than *Minnesota*, is the largest vessel that has ever visited an Oriental port. Her carrying capacity is almost as great as that of the largest Transatlantic freighters. From keel to pilot-house she has 11 decks, and in her immense hold she can carry an almost inconceivable quantity of bulk cargo. Whole trains, with locomotives, will be transported within her steel sides to Japan, China, and Korea, and in her 4 classes of passenger apartments are accommodations for a small army of travellers. *Dakota's* principal dimensions are:—Length 630 ft., breadth 73½ ft., depth 56 ft., and gross tonnage 21,854 tons. She thus exceeds the gross tonnage of any other ship now in commission, the next in order being *Cedric*, length 700 ft., breadth 75 ft., depth 49 ft., and gross tonnage 21,400; and she will only be eclipsed by *Kaiserin Auguste Victoria*, 25,000 tons; and *America* 23,000 tons, now building.

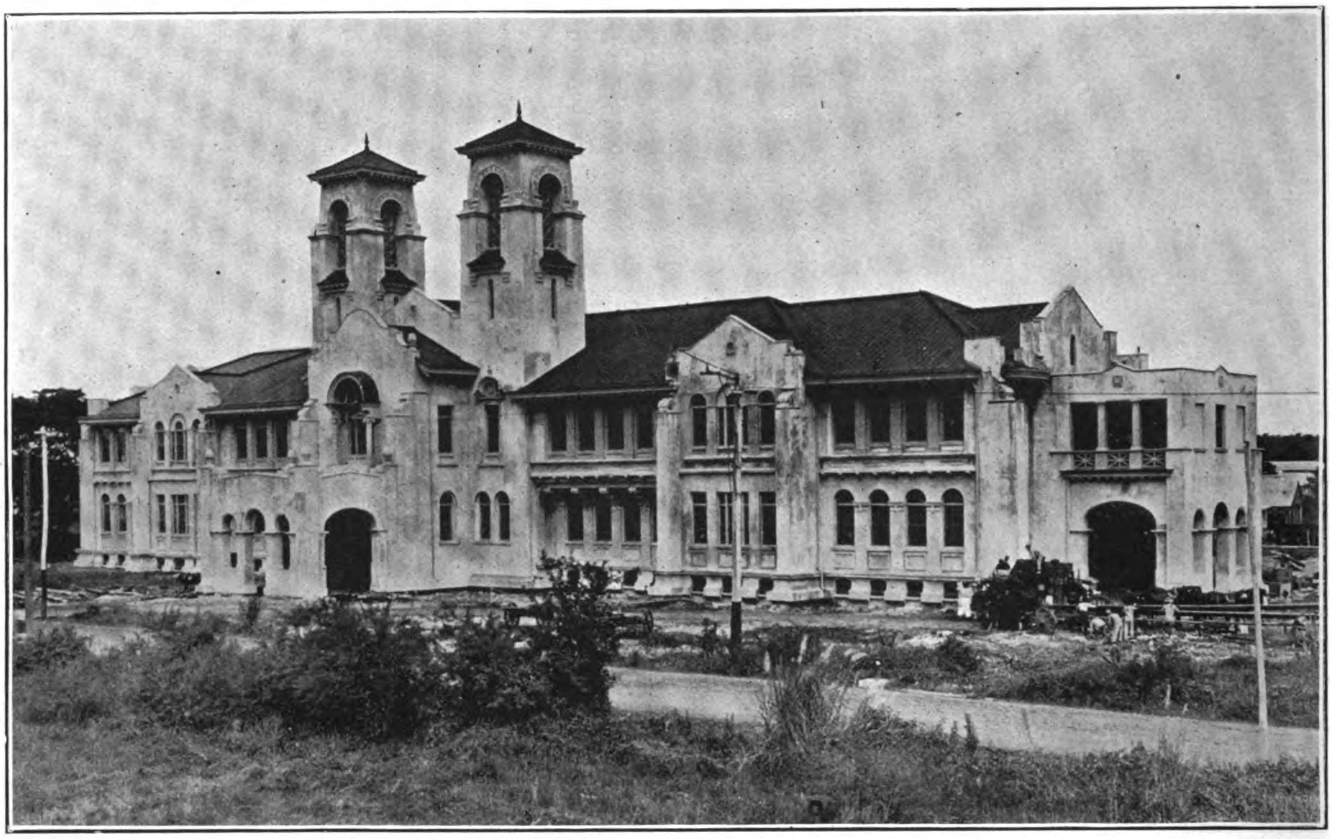
Mr. Howard James, vice-president of the Great Northern Steamship Company, visited the Orient on this voyage of *Dakota*. At Hongkong he talked with a representative of the Hongkong *Telegraph*, and in the course of conversation said that on every trip from America the vessels of the company had been crammed with cargo. At present the cargoes from this end were not quite sufficient to fill the holds, but he was convinced that the vessels would soon be getting all the cargo they could take. Asked whether his company contemplated the construction of additional vessels for the run to the Orient, Mr. James replied that the Great Northern was content with the ships it had. There was no scheme in hand to build new vessels. Mr. James said his trip to the Orient was only in the nature of a holiday, and on the subject of the steamer *Dakota* he was exceedingly enthusiastic. He personally conducted the representative of the Hongkong *Telegraph* over the vessel, and according to that paper the staterooms certainly are magnificent. The cabins are furnished luxuriously, provision being made for the circulation of hot air and the withdrawal of vitiated air. One feature alone shows how the Great Northern has endeavored to provide for the comfort and convenience of their passengers. Inside each bunk, at the head of each bed, there is an electric light, so that passengers can lie reading in bed. Everybody knows how uncomfortable, or rather how impossible it is to attempt to read in bed on the old-fashioned boats. On *Dakota* it is recognized that people do like to read a chapter before turning off to sleep, and accordingly the lamp is there for them. The first-class staterooms remind one of a suite in a first-class hotel. There is nothing to show that the passenger is on board ship, except the windows. The rooms are furnished like a hotel, the bed and appointments would be considered suitable at any first-class hotel, and the private sitting-room, reading-room, and bath-room are thoroughly up-to-date.

The steamer *Dakota* will sail from Hongkong January 27th, 1906, for Seattle, *via* Shanghai, Nagasaki, Kobe, and Yokohama, while *Minnesota* will sail from Hongkong, December 19th, for Seattle *via* the same Oriental ports. Messrs. Smith, Bell & Co. are the Manila agents for the Great Northern Steamship Company.

MINING IN CHANGSHA PROVINCE, CHINA

There has been little or no advance in the mining development of this rich province during the last 18 mos. The official bureau of mines, or Kuang Wu Chu, has relinquished its control of the whole province, according to a consular report, and now directs only three mines, viz., those at Ping-chiang, Hsin-hua, and Shui-k'ou-shan. The rest of the province has been allotted to three "gentry" companies, the directors of which are officially appointed, but the basis is essentially commercial. All mining concessions must be sought from these companies. As a matter of fact, it is not intended to grant concessions if it can be avoided; but it is to be hoped that foreign skilled advice and supervision will be obtained, otherwise the outlook for the investor is poor. From an interesting report prepared for the Imperial commissioner, T'ieh Liang, no less a sum than Tls.2,000,000 have been expended in mining enterprises during the past 10 yrs., nearly all provided by the provincial treasury. Various mining centers have, however, been successively shut down, owing to the ruinous losses experienced, and only one mine (lead and zinc) has been in any way remunerative. British enterprise, except that represented by two shipping firms with a steamer each and a Chinese agency, is at present not in evidence. There are rumors, however, that two companies have been promoted in London to operate certain mines, in conjunction with Chinese; but nothing definite has so far resulted. German firms have been in touch with Hunan for several years and contracts for the delivery of ores are still running. Two representatives of an important European company have been in residence for a year endeavoring to secure business. The Japanese are well alive to the possibilities of the province—their representatives are everywhere. The P'ing-hsiang coal mines turn out, it is said, some 1,000 tons of coal a day; part of this, made into coke, is used in the various government works in Hupeh and elsewhere and some is sold in the Hankow market

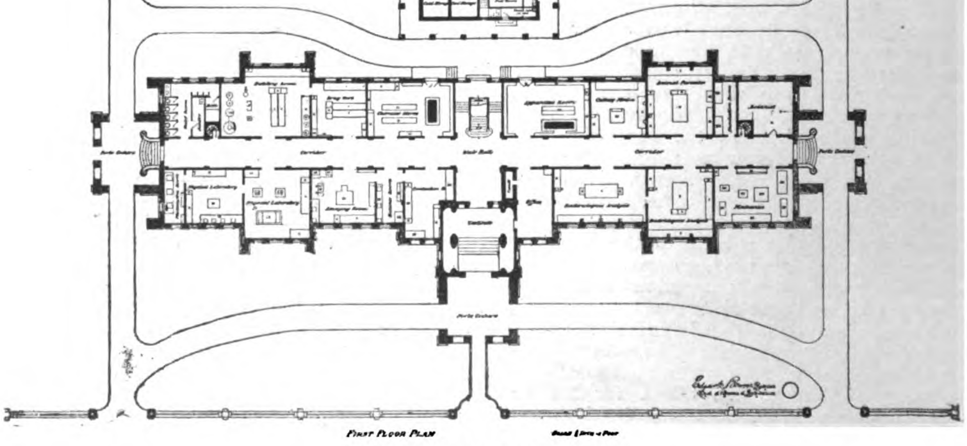
LABORATORIES OF THE BUREAU OF SCIENCE, PHILIPPINE GOVERNMENT



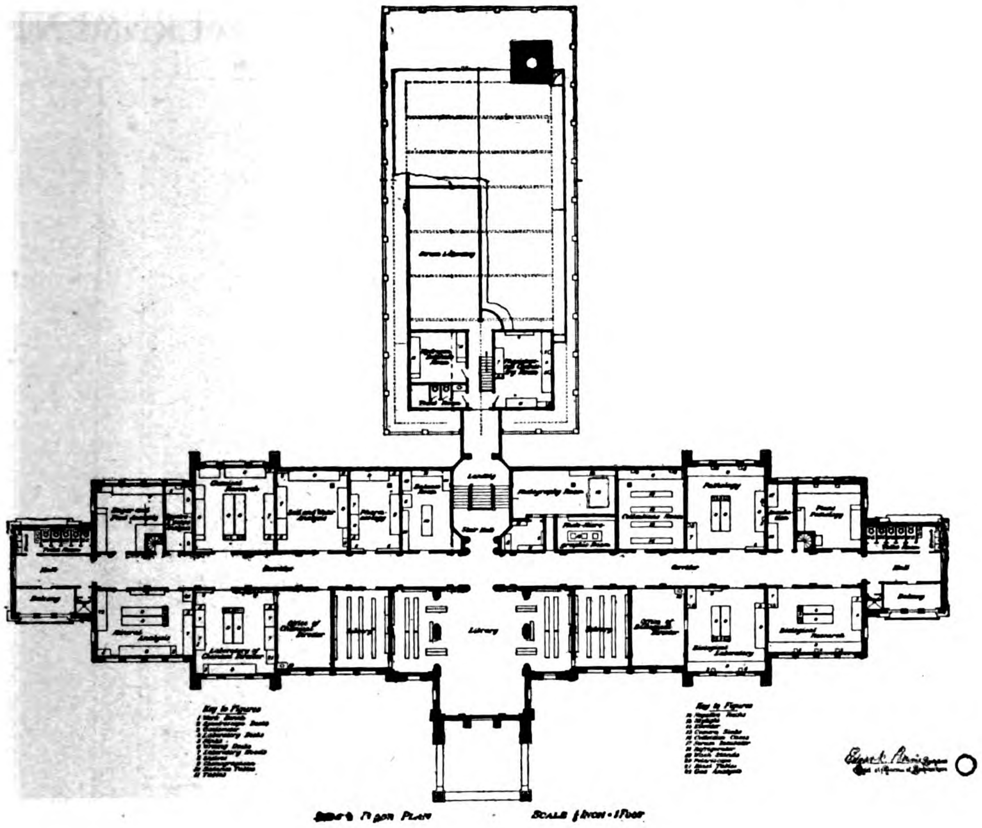
FRONT ELEVATION OF THE LABORATORY BUILDING.

In his introductory remarks to a description of the construction and equipment of the new laboratory buildings of the Bureau of Science (fomerly the Bureau of Government Laboratories), only recently completed in Manila and occupied, Paul C. Freer, M. D., Ph. D., founder and director of this important adjunct of the Philippine Government, has the following to say about the scientific laboratory and its relation to the Tropics:—

"Tropical countries which are subject to colonization by the white races present conditions which are such that the settlers are continually exposed to infectious diseases, differing from those prevalent in colder regions, and, owing to the fact that the European races in these countries have been moved from their native soil they are exposed to greater dangers than the native population, which have become accustomed to the surroundings. However, it is true that the natives contract the same class of diseases and are subject, though perhaps in a lesser degree, to the same dangers. Tropical localities are especially prone to the occurrence of serious epidemics both of man and of animals. In all such countries the native population regard the causes of the sicknesses which afflict them from a standpoint entirely different from that of the educated white man. Superstition and imperfect education leads them to disbelieve in measures which the modern scientific world has recognized as necessary. For this reason, health boards, modeled more or less after those of the mother countries but modified as to their powers and duties in order to meet existing conditions, have been deemed essential in all tropical colonies, but their work to a very great extent would be imperfect, haphazard, and unsuccessful if the methods of prophylaxis were not guided and sustained by a scientific knowledge of the causation of disease and by accurate diagnoses of the exact nature of the infections which are encountered. From a material standpoint, the damage to commerce caused by epidemics of cholera, plague, rinderpest, and surra is such that the loss where these diseases gain a foothold by far outweighs the cost of any measures of prevention, however expensive. For the purpose of diagnosis and for the further study of methods of prophylaxis and cure, a biological laboratory, properly equipped, is an essential. The work is of so difficult a nature, so important, and, if imperfect methods are used, so subject to error that a poor equipment both in the literature of medical biology and in apparatus would be the precursor of failure. The appliances must be of the best, the literature on all branches of the work must be at hand, and the bacteriologists performing the diagnoses must have a thorough and complete training. However, bacteriological laboratories in the Tropics must not confine themselves to subjects of diagnosis—they must also be expected to make advances by research on special subjects of importance, and they must continually enlarge their field by the observation of interesting or new diseases which may come to their attention, because it can never be predicted that an apparently harmless malady which is imperfectly known may not eventually assume



FIRST FLOOR PLAN.

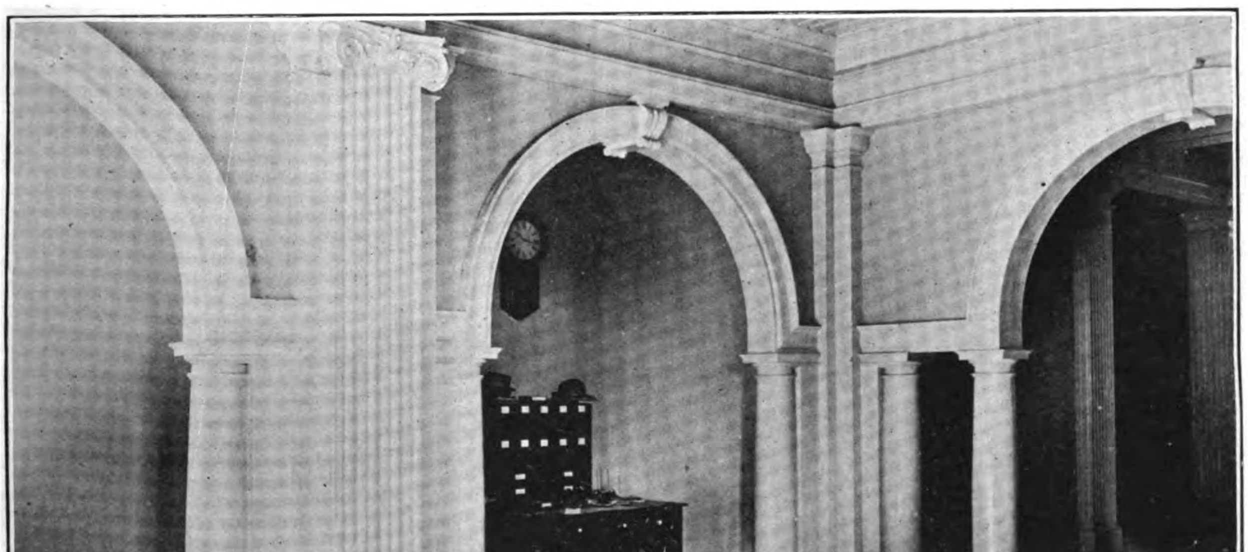


SECOND FLOOR PLAN.

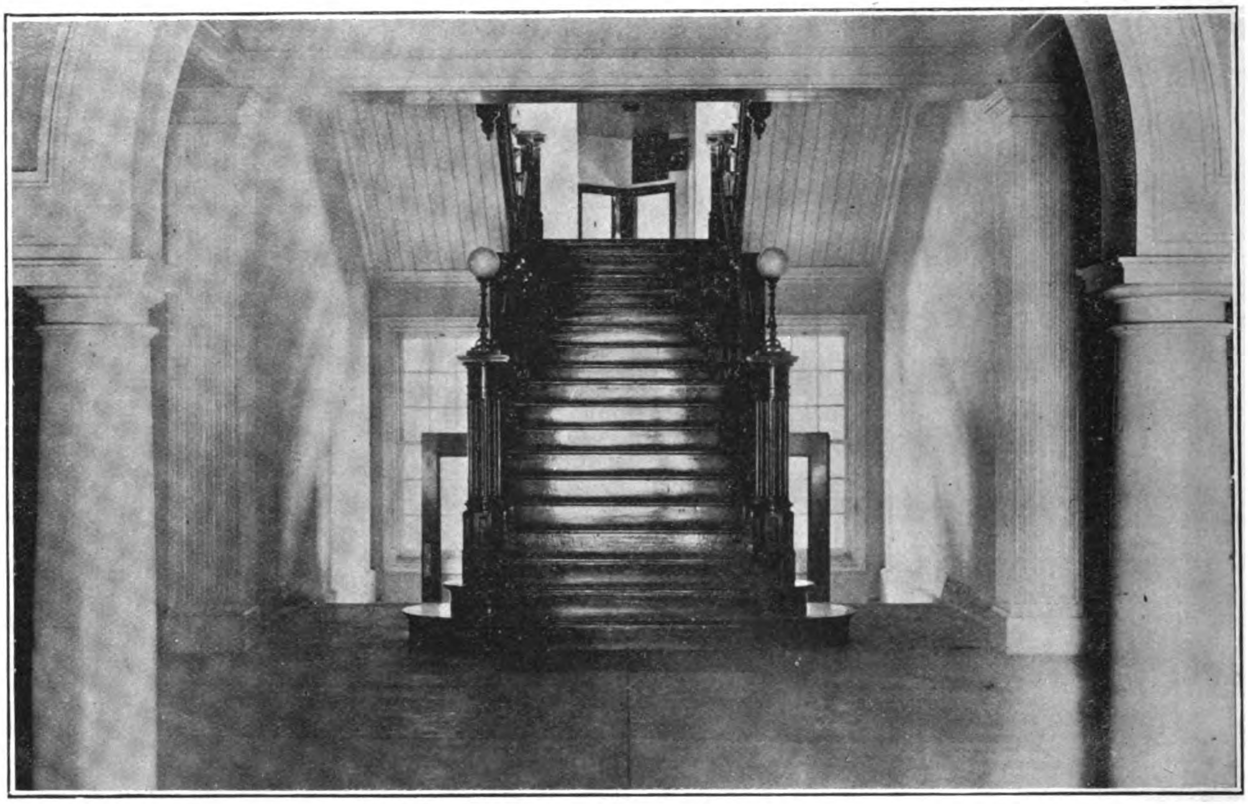
serious proportions. In so doing the laboratories can guard the public by timely warnings. Each tropical colony presents different conditions, different phases of the same disease, and even new and unknown infections. The prevention of the spread of any disease must presuppose a perfect knowledge of its etiology and of the other factors which enter into its prevention and treatment, and such knowledge can only be gained by an investigation of the subject based upon a study of the literature and supplemented by new investigations in the laboratory. Research in the field outlined above demands the highest type of trained investigators, a complete library, and exceptional facilities. The value of this class of work is so universally recognized that governments in the past have organized expensive expeditions to tropical countries for the purpose of increasing the world's knowledge of the diseases peculiar to those regions. However, such expeditions can not possibly carry with them all the materials for their work without encountering great difficulties which rob them both of time and opportunity, and their results would be far more beneficial if they could come to permanent stations.

"For a properly equipped biological laboratory there are necessary not only adequate rooms, well lighted without direct sunlight, but also apparatus such as microscopes, incubators, sterilizers, microtomes, surgical instruments, glassware of all kinds, stains, chemicals, and small animals. The latter, such as guinea pigs, rabbits, monkeys, goats, and dogs, are as much a portion of the laboratory reagents as are the culture media in which the bacteria grow or the microscopes through which they are seen.

"Tropical colonies are also of necessity regions the prosperity of which depends upon agriculture, upon an exploitation of the natural products, upon mining interests, and the means for the barter and sale of raw products. They can not under present conditions, or presumably even in the remote future, become manufacturing centers excepting for products closely related to their chief staples. It is a fact that the interior of many of these countries is but little known, that the products are gathered by persons ignorant of their true uses and values, that in many cases they are allowed to go to waste for want of a proper knowledge, and that in others the exploitation is desultory and imperfect. Some phases of tropical agriculture are fairly well advanced; among these may be mentioned the culture of the cocoanut, of hemp, rice, etc., but when it comes to articles of a different character, which are obtained from the forests or mines, it is found that much uncertainty exists. Gums and resins, which are supposed to be of but little value to the natives and which they may use for fuel or for lighting purposes, may, on distillation, produce substances of far higher commercial value. Medicinal plants may exist in large numbers with qualities unknown or imperfectly known to the people, but containing alkaloids and other materials which if properly investigated would be readily marketable at high prices. New fields of enterprise, based upon knowledge secured in other countries, may also be introduced. In order to gain advantages not heretofore obtained in the conservation and exploitation of natural products or of those introduced for the purposes of culture, bureaus of forestry, agriculture, and mines and commercial museums have been established, but all of these need the assistance, advice, and research work of laboratories to answer questions as to the nature of soils and minerals, the value of ores, the uses and compo-



MAIN ENTRANCE.

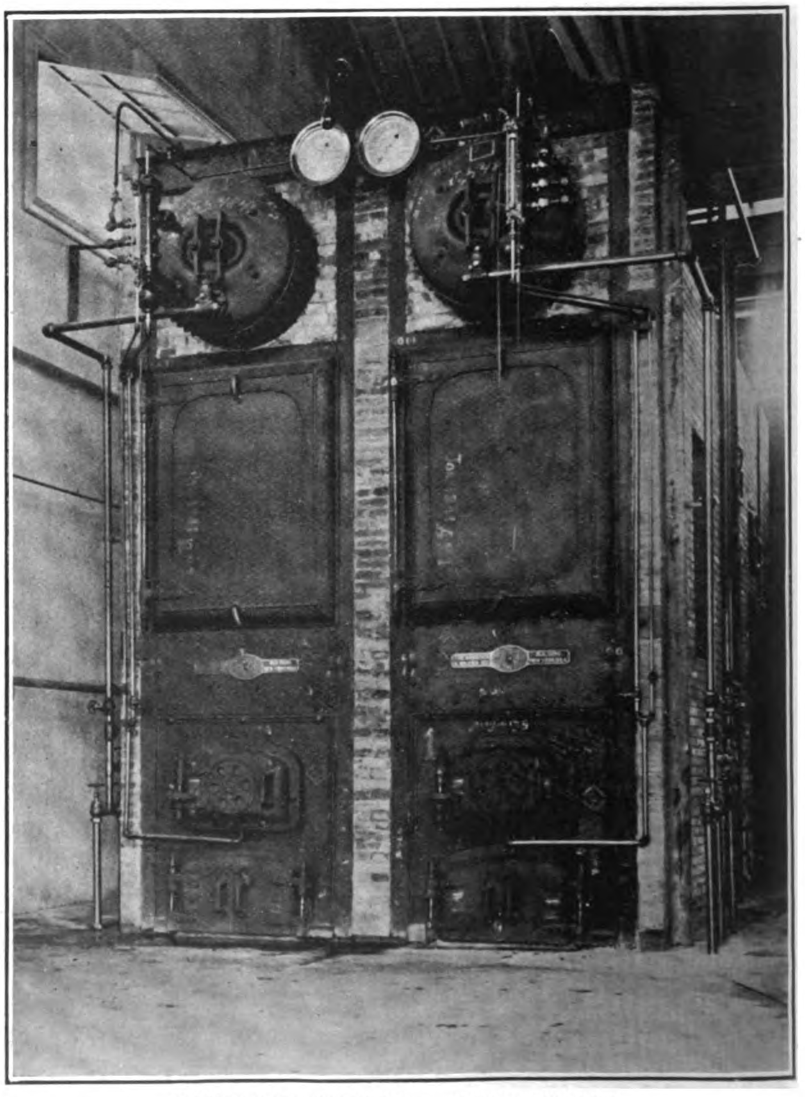


MAIN (FRONT) STAIRWAY.

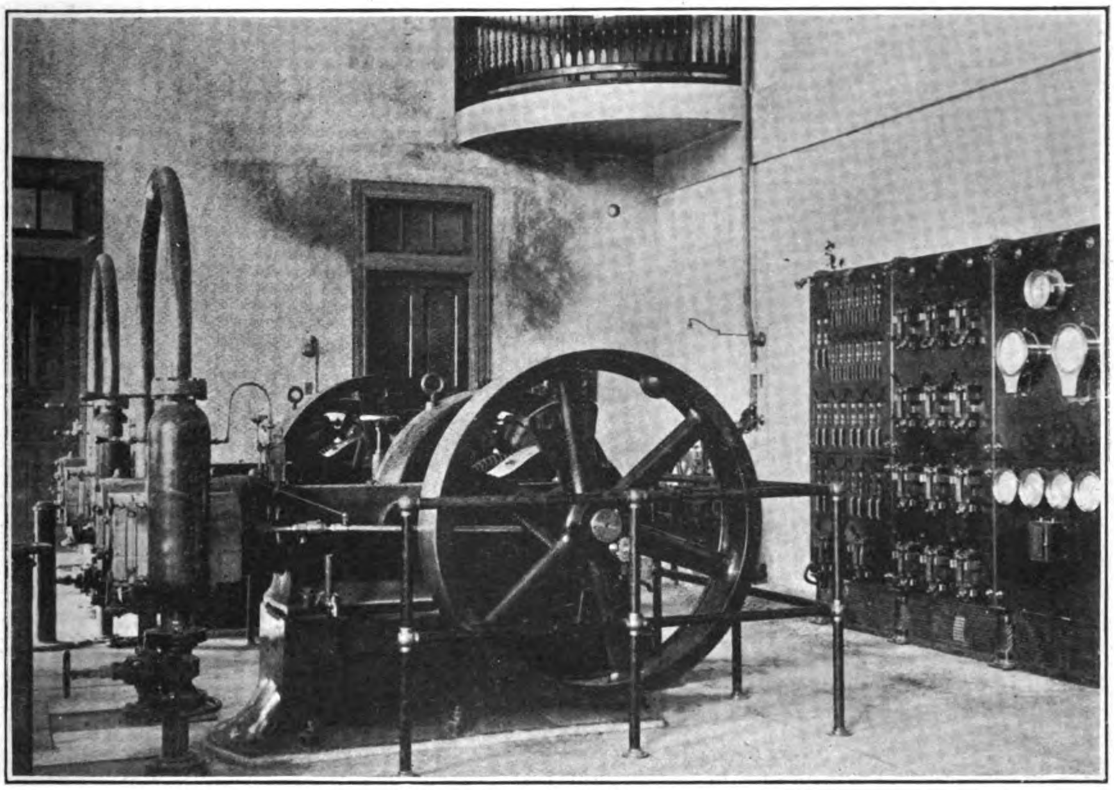
sition of oils, gums, resins, and medicinal plants, and without such assistance the value of their work would be but a fraction of what it is.

"For the purposes of study of the subjects mentioned above a necessity exists for a laboratory of chemistry andfor facilities to pursue and complete accurate researches on the materials which can be obtained. In the Tropics, as well as in other countries, the question of

REAR VIEW SHOWING THE SERUM LABORATORY POWER-HOUSE AND STACK.



BATTERY OF BABCOCK & WILCOX BOILERS.



CORNER OF THE ENGINE ROOM.

the character of the foods and drinks, the analysis of imported products which too frequently are adulterated, the determination of values for customs duties, the testing of the strength of cements, the assaying of ores, and the performance of other analytical work are necessary, and, as these regions are not supplied with universities, analytical laboratories must be provided in charge of the various governments.

"As the people depend upon products of the field and of the forests for so large a proportion of their sustenance and barter, a knowledge of the flora of the Tropics is essential, from both a scientific and a material standpoint. It is necessary to be able to identify plants which have once been encountered in order to understand something of their distribution and general importance, to study their growth, the conditions necessary for their best development, and their diseases. Bureaus of forestry and agriculture must depend upon botanical work to assist them in their duties. The chemist, in investigating plant products, needs an identification of the plants from which the latter come. For these reasons botanical work becomes as essential as that in any other laboratory field.

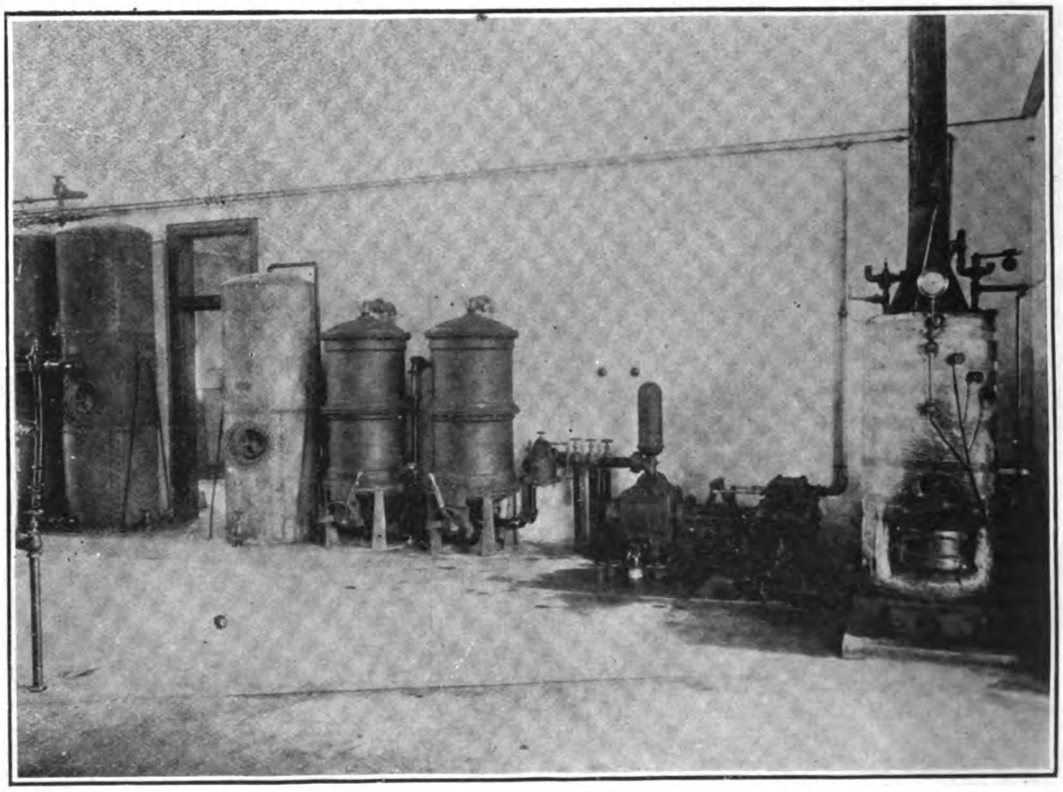
"Tropical countries are, *par excellence*, those in which insect pests are most frequent and widely distributed, so that the means for the study of entomology, facilities for classifying the material gathered, and for ascertaining the nature of the insects most dangerous to valuable flora should be at hand, and this need must be met by the employment of entomologists and by providing space for their work.

"Modern methods for the treatment of disease have become more and more dependent upon serum therapy. The results obtained with rinderpest in South Africa and in India, with plague prophylactic in Japan, with cholera prophylactic in India and Japan, and the necessity for vaccination against smallpox, at once suggest the establishment of serum laboratories in tropical countries. Because serums are perishable they can not very successfully be shipped through long distances, and many of the tropical diseases which yield either to serum prophylaxis or therapy are of such a nature that the serums themselves can not be prepared except on the spot.

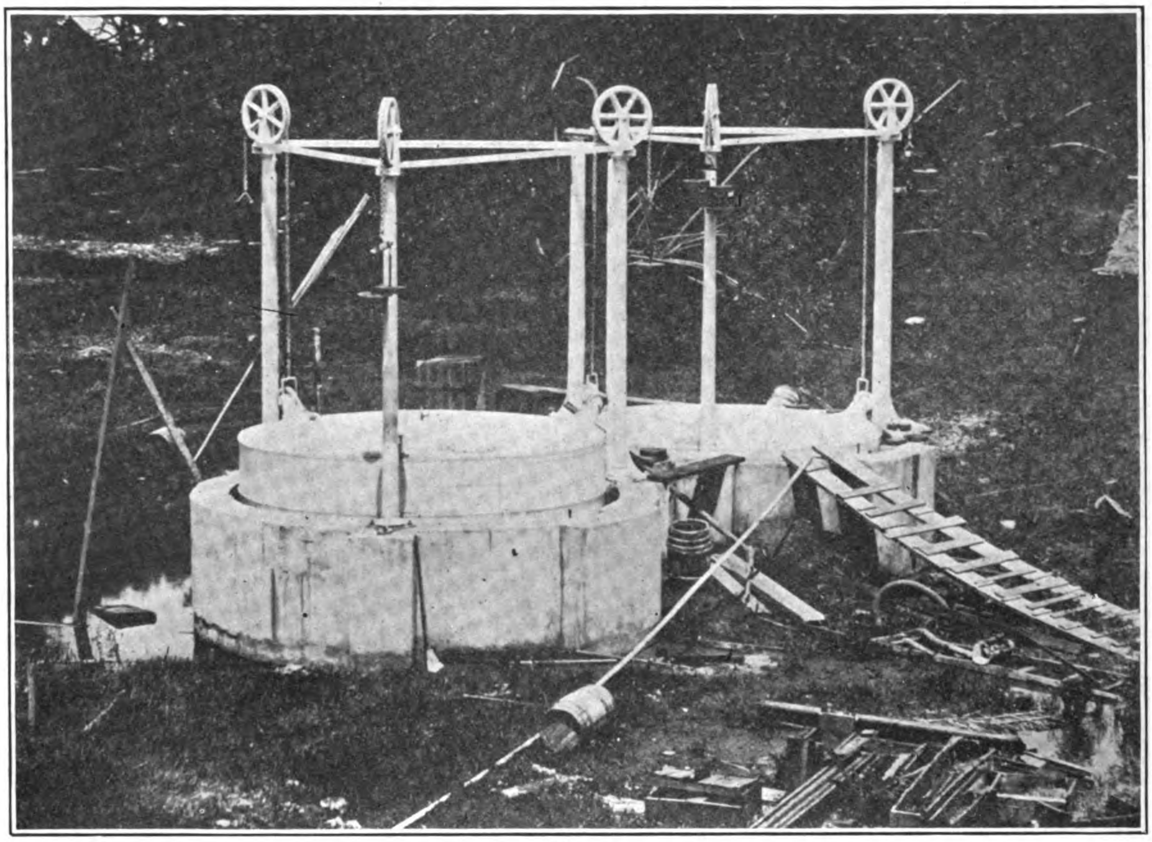
"Other branches of laboratory work readily suggest themselves as being equally essential to the proper development of colonial enterprise. One of these would be a study of the fauna of the regions in question, both marine and terrestrial. A laboratory for zoology and marine biology would be entitled to equal rank with the others mentioned above.

"A government in beginning its work can adopt one of two lines of action. It may either allow its various divisions which come in contact with and which need scientific aid themselves to establish the various laboratories in question, each under separate direction and each with separate facilities, or it may adopt the course of inaugurating one central institution where all this class of work can be united, where, therefore, the workers can be in close contact, and where each division is well aware of what is being done in the others. Cooperation in this sense would be most complete, and while there might be some slight disadvantages in the latter course by reason of the fact that the various divisions of the government could not in their own quarters study and obtain the results looked for, these are by far outweighed by the cooperation which can be obtained between the scientific men by the division of labor, which frequently saves both time and money, and by the reduction in equipment, which inevitably follows a concentration of allied interests."

LOCATION AND PLAN OF THE BUILDINGS.—The Civil Government of the Philippine Islands, taking all of the above-mentioned facts into consideration, and knowing well the expense



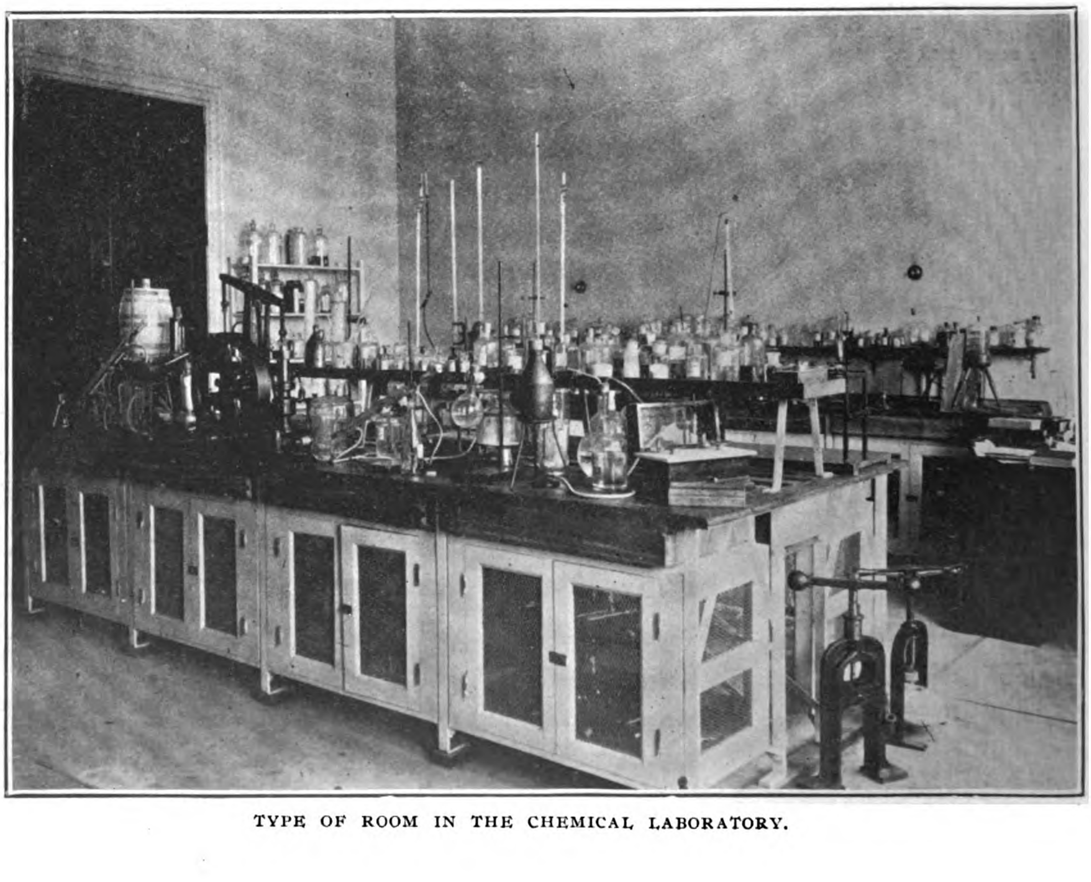
CORNER OF THE BOILER ROOM SHOWING FIRE PUMP, FILTERS, ETC.



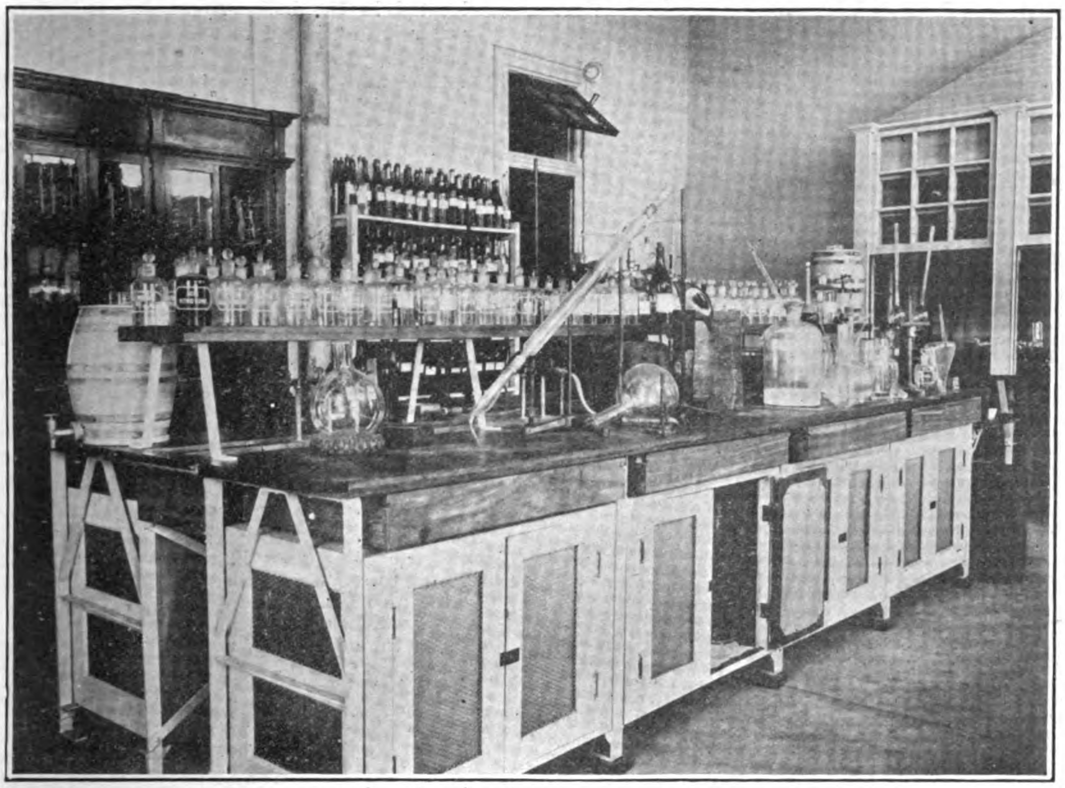
GAS TANKS.

and loss of efficiency due to a scattering of its scientific energies through a number of bureaus, decided to establish one central laboratory system, to properly equip and house this series of institutions, and to place them under a central direction. The result is the new government laboratories which now occupy a commanding site on the old exposition grounds between Calle Herran and Calle Padre Faura in the city of Manila. The buildings are divided into a main laboratory structure, facing toward the S. and divided into two symmetrical portions, the one on the E. for the biological and the one on the W. for the chemical laboratory. The power house was placed to the rear and connected with the main structure by means of a corridor, and in addition to the space for the boilers and engines it provides room for the serum laboratory.

The whole structure, therefore, is in the form of the letter T, that portion of it in which biological and chemical work is carried on being so planned as to give the minimum of direct sunlight—a great desideratum for microscopic work. Bisecting the main structure lengthwise are three corridors 10 ft. wide and 236 ft. long, the one in the foundation being for the purpose of giving access to all the pipes leading from the power house and to provide space for the storage battery. The two upper hallways are the main passageways of the building and all of the rooms open on them. The eastern half of the structure is devoted to biological work with the exception of the space occupied by one room (No. 10) for storage of apparatus and another for offices (No. 13). Passing through the main entrance and turning to the right, the disposition of the rooms is as follows: No. 12 for the preparation of culture media for biological work, No. 14 for botanical work, No. 18 as a storehouse for botanical duplicates, No. 19 a mechanic's room, Nos. 17 and 15 for bacteriologic diagnosis and research. On the upper floor in the same order No. 116 is for the photographer, No. 118 for the pathological museum, No. 120 for pathological work and research, No. 122 for incubators and refrigerators, No. 124 for entomological work, No. 121 an outdoor laboratory for the entomologists, No. 119 a laboratory room for bacteriological and pathological research, No. 117 for biological research, and No. 115 as an office for the director of the biological laboratory. Turning to the left from the entranceway on the ground floor, room No. 8 is for the storage of chemicals and apparatus; No. 6 as a laboratory for organic chemistry in connection with drugs, medicinal plants, and natural products; No. 4 for a commercial laboratory in chemistry, with the machinery for carrying on commercial processes on a laboratory scale; No. 1 for photometric work; No. 3 for physical chemistry and physics; No. 5 for the same purposes and for the adjustment of weights and measures; No. 7 for assaying and mineral work; No. 9 for a balance room, and No. 11 for organic combustion. On the second floor and in the same order No. 114 is the balance room for the upper floor; No 112 for the use of the ornithologist; No. 110 is a chemical laboratory fitted for work with soils, water, and organic chemistry; No. 108 a chemical laboratory fitted for all classes of work; No. 106 for spectroscopes and instruments of precision; No. 104 for sugar, foods, and physiological chemistry; No. 103 for mineral analysis; No. 105 for general chemical work of all classes, and No. 107 as an office for the superintendent of government laboratories. The three central rooms to the front— Nos. 109, 111, and 113— are for the purposes of the library, Nos. 109 and 113 being stack rooms and No. 111 the reading room, stack room, librarian's office, and general library. Passing



TYPE OF ROOM IN THE CHEMICAL LABORATORY.



ROOM IN THE CHEMICAL LABORATORY SHOWING TYPE OF CENTRAL DESK.

to the rear on the ground floor and turning to the left in the power house, Nos. 50 and 51 are for cold storage, No. 52 for the packing and shipping of vaccine and serums, No. 53 for the preparation of serums, No. 54 as a room for the preparation of culture media for the serum laboratory, No. 55 as a boiler room, No. 56 for the gas-plant generators, No. 57 for coal, No. 58 for a crematory, No. 59 for the engine room, and No. 60 for cold-storage machinery. No. 153 is the office of the director of the serum laboratory and Nos. 150 and 152 are laboratories for bacteriological and pathological work of the serum laboratory. To the rear of the entire structure are placed the animal houses, including buildings for the storing of guinea pigs and rabbits, with a wing for work on bubonic plague and contagious diseases; a stable for the serum horses, one for the vaccine calves, and one for the storing of monkeys, dogs, and goats. The list given above completes a statement of the purposes for which the rooms were originally intended, but the detailed description which will be given below makes it evident that the building is really so constructed as to give it great elasticity in the class of work which can be conducted therein and in providing for a large increase in the number of workers.

POWER EQUIPMENT.—The boiler-room equipment consists of two 75 h. p. Babcock & Wilcox steel sectional boilers set in one battery and designed for a working pressure of 150 lbs. per sq. in. Steam is led from the boilers through 4-in. copper-expansion bends to an 8-in. extra-heavy steel-pipe header, from which a 7-in. steam main drops to the pipe subway. The engine supplies are 3-in. copper pipes tapped into the 7-in. main and carried into the engine room below the floor line, from where they are carried up to the cylinders by expansion bends of 4-ft. 4-in. radius. The exhaust main is 8-in. standard pipe, and passes through a 200 h. p. Wainwright even-flow feed-water heater, which is placed in the subway, and from the latter it passes through the boiler room to the atmosphere, being fitted with a 24 by 30 in. bent exhaust head. The main steam and exhaust lines are drained by two Bundy return-steam traps discharging into a feed-suction tank located in the subway.

The flue gases from the boiler are led through a sheet-steel smoke header to the main smokestack, which is of 48-in. internal diameter and 103 ft. high. A damper is fitted into the smoke header which is automatically controlled by a Locke hydraulic damper regulator. A 24 by 60 in. vertical auxiliary boiler, with a Deane $3\frac{1}{4}$ by 4 in. duplex steam pump, is installed for general water service during periods when the main boilers are shut down. The feed water for the main boilers passes through a Loomis-Manning Type H pressure filter, which discharges into a filter tank having a capacity of 500 galls., from which it is carried to two $11\frac{1}{2}$ in. Metropolitan double-tube injectors fitted to the main boilers, the auxiliary boiler and pump, and to the main feed pump, which is of the Deane triplex single-acting type, with cylinders 4 by 4 in. geared to a Stow multispeed motor. The pump and motor are located in the pipe subway, and receive water from the steam traps and cylinder jackets of the air compressor, vacuum pump, and ice machine, as well as from the filter tanks.

The fire pump is of the Deane duplex inside-plunger pattern, $7\frac{1}{2}$ by $4\frac{1}{2}$ by 10 in., with 4-in. suction and 3-in. discharge to the fire-main system in the main building. A connection is also made from this pump to the house-service tanks, two in number, having a combined capacity of 900 galls., located on the S. side of the boiler room. The tanks are so connected that they may be used either together or singly. Coal-storage capacity of 30 tons is provided on the N. side of the boiler room.

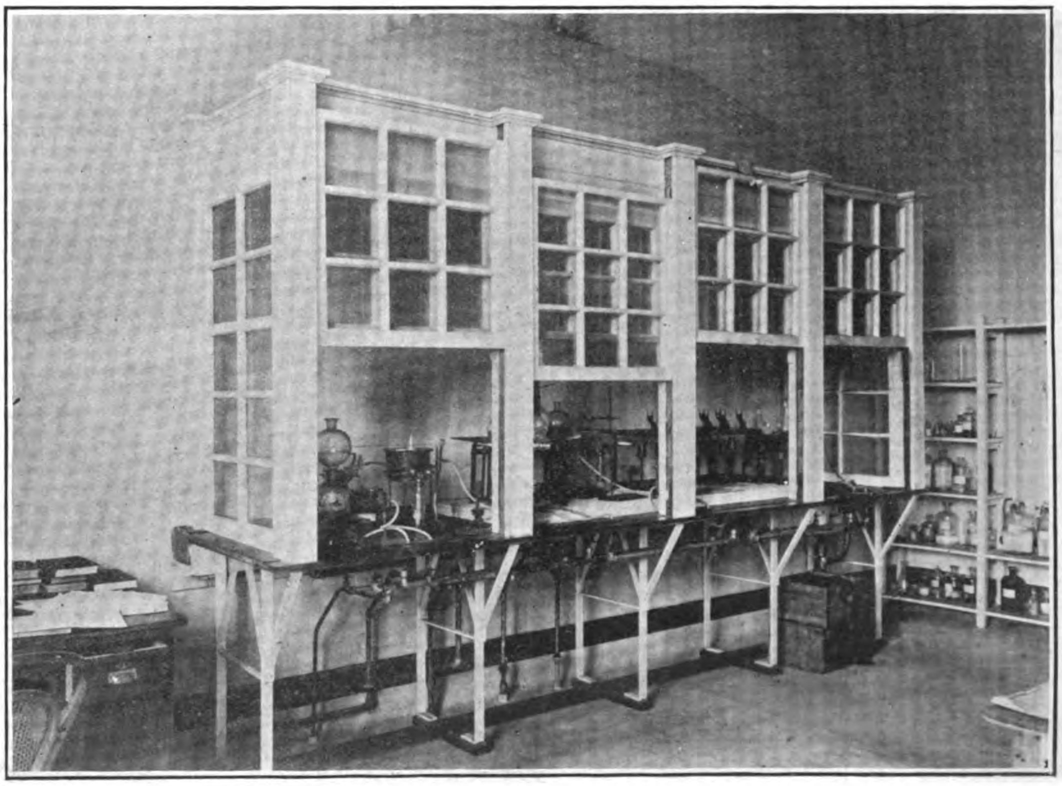
Two Mansfield oil gas generators of a capacity of 100 cub. ft. per hr. each are installed close to the coal bunkers and deliver gas to two sheet-steel gas holders, each of 1,250 cub. ft. capacity, located 100 ft. from the power-house building. A 12-in. smoke header connects the gas-generator furnaces to the main stack.

A cremating furnace 10 by 5 by 6 ft. is built at the foot of the main stack, having 12 sq. ft. of grate surface and an incinerating chamber of 4 by $2\frac{1}{2}$ by $2\frac{1}{2}$ ft. for burning laboratory refuse, small animals, etc.

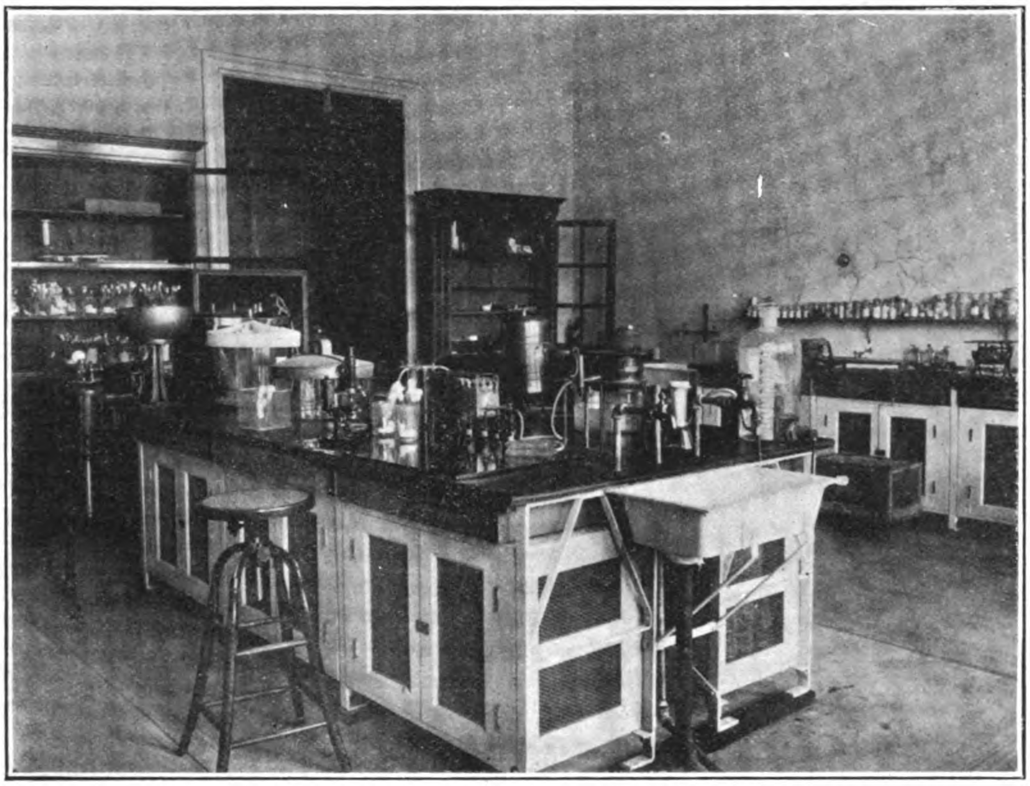
All piping, conduits, etc., connecting the various apparatus in the boiler room pass through a concrete trench covered by checkered-steel floor plates to the pipe subway, from which point they are carried to the basement corridor in the main building. The piping ranges in size from $\frac{1}{4}$ in. to 8 in., and wire conduits from $\frac{1}{2}$ in. to $2\frac{1}{2}$ in. The subway and corridor are automatically drained by Lawlor cellar ejectors worked by water pressure.

The W. end of the main basement corridor contains a storage battery of 20 cells from which current is conveyed to various laboratory rooms.

The engine-room equipment consists of two horizontal single-expansion Ideal automatic engines of 60 h. p. each, direct connected to two Westinghouse $37\frac{1}{2}$ kw. 6-pole compound-wound direct-current generators. Each unit has a capacity of 300 amperes at an electromotive force of 125 volts at a speed range of 290 to 320 r. p. m. The generators are fitted with equalized connections for parallel working. Current is led from the generators through loricated-steel conduits laid below the flooring to a 5-panel black slate switchboard 15 ft. long. Each generator is protected by an I-T-E laminated contact circuit breaker. The switchboard has two-generator one-power distribut-



ONE OF THE LARGER HOODS IN THE CHEMICAL LABORATORY



ROOM IN THE BIOLOGICAL LABORATORY SHOWING TYPE OF CENTRAL DESK.

ing and one light-distributing panel, and one panel for instruments; it also carries all the air, gas, vacuum, water, steam, and electrical indicating and recording gauges. Ten light-and-power feeders are carried from the distributing panels by means of 2-in. loricated-steel conduits through the subways to eight distributing panels located in the corridors of the main building, and two power feeders pass through conduit to the towers to supply the exhaust-ventilator motors.

Compressed air is supplied by a No. 21 "Christensen" Type N 8½ by 8 in. horizontal compressor of 75 cub. ft. per minute capacity. The compressor is direct geared to a 14 h. p. series-wound four-pole motor, and is automatically controlled between any predetermined maximum and minimum pressure. The air receiver is 3 ft. in diameter by 10 ft. high and is located in the boiler room.

The vacuum pump is a 7 by 7 in. "Clayton" type, and is geared to a General Electric CE type direct-current 3 h. p. motor and will maintain a vacuum in the pipe system of the main building of approximately 29 in.

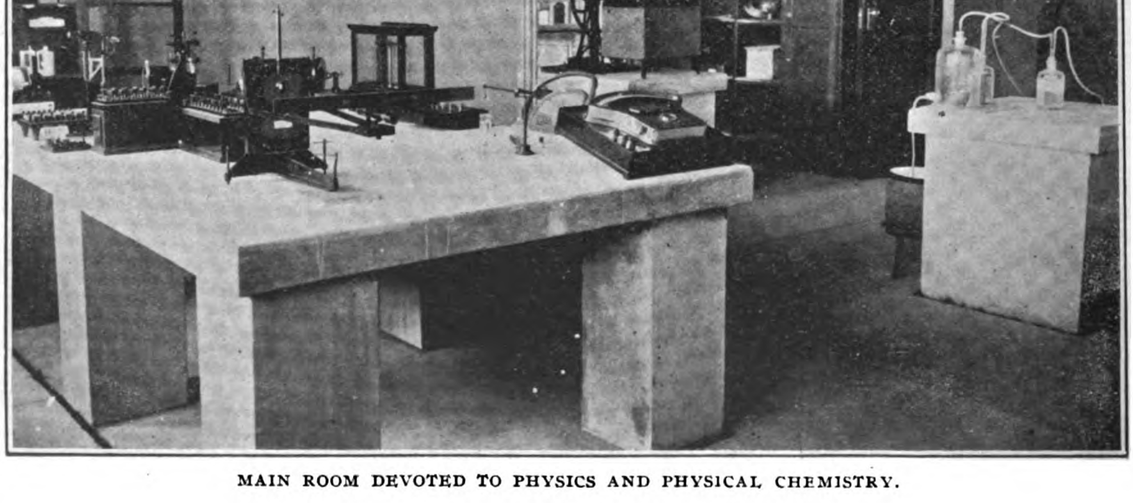
The house-service pump is a No. 4 "Quimby" type, direct connected to a General Electric CE type 15 h. p. motor, automatically controlled between any predetermined maximum and minimum pressures up to 125 lbs. per sq. in. The pump has a 4-in. suction and a 3-in. discharge to two 36 by 120 in. compression tanks located in the boiler room, from which the water is distributed to the main building and animal houses.

The refrigerating machinery consists of a "Brunswick" double-cylinder single-acting ammonia compressor of 3 tons refrigerating capacity, direct connected to a General Electric 8-pole slow-speed motor, a double-pipe ammonia condenser, oil separator, ammonia receiver, with combination gauges, thermometers, etc., located in the S. end of the engine room. The brine tank is 4 by 6 by 14 ft. and contains five 1-in. ammonia expansion coils; the chilled brine is circulated by a "Quimby" No. 2½ rotary brine pump, direct connected to a General Electric CE type l. h. p. motor, and passes to two cold-storage rooms having a joint capacity of 3,000 cub. ft. and to two refrigerating boxes in the main building each having a capacity of 200 cub. ft. Each of the main storage rooms has five refrigerating coils of 1¼ in. galvanized pipe and will be maintained at a temperature of 28° F.

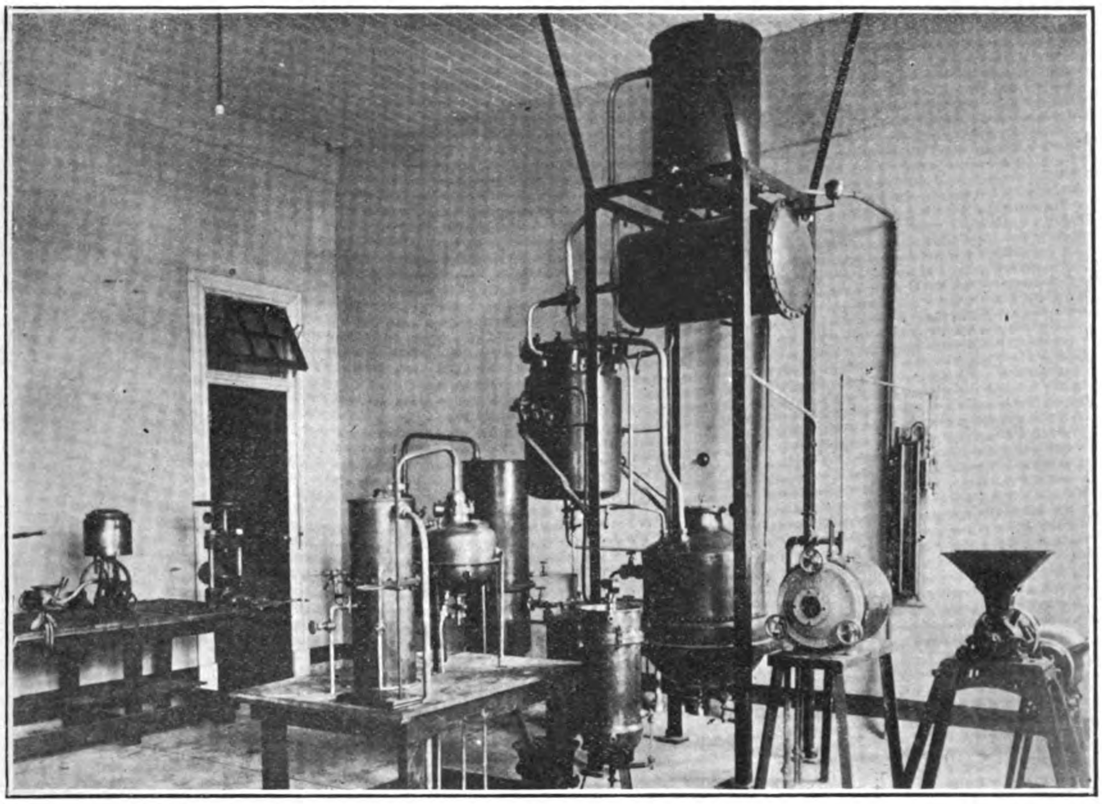
Two 15-in. "Buffalo" B volume No. 6 exhaust fans, direct connected to General Electric CE type 5 h. p. motors, are located in the towers of the main building and connect with a 16-in. exhaust main in the attic, from which 4 and 6 in. branches are carried down to the hoods on the first and second floors. The motors are operated from the main switchboard by means of solenoil-controlled switches and self-starting rheostats.

The exhausters will maintain a velocity of 1,800 ft. per minute through the mains and will allow a complete change of air every minute in all the hoods.

Starting from the power house all the main distribution of the building is through a subway which is in the form of the letter T, the portion entering from the power house joining that from the main building at about the middle. The diameters of the piping leading to the various laboratory rooms have been calculated so as to give as equal a supply as possible of gas, water, vacuum, air pressure, and steam in the various rooms. In order to effect this, the water and gas mains form loops on each floor of the two wings of the main building, thus supplying a perfectly even circulation, and the taps to the individual rooms and desks are taken from these loops. The electric-light wires as well as those of the storage battery and telephones are carried throughout in steel conduit and distributed wherever needed, so



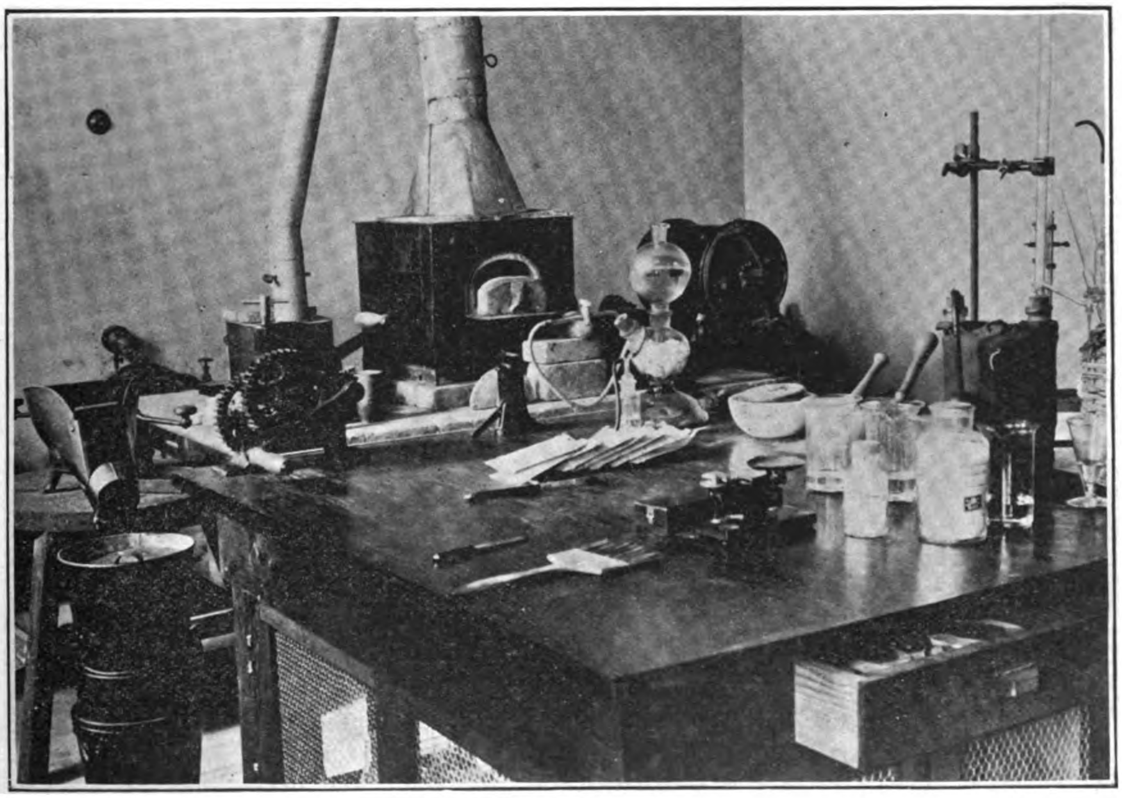
MAIN ROOM DEVOTED TO PHYSICS AND PHYSICAL CHEMISTRY.



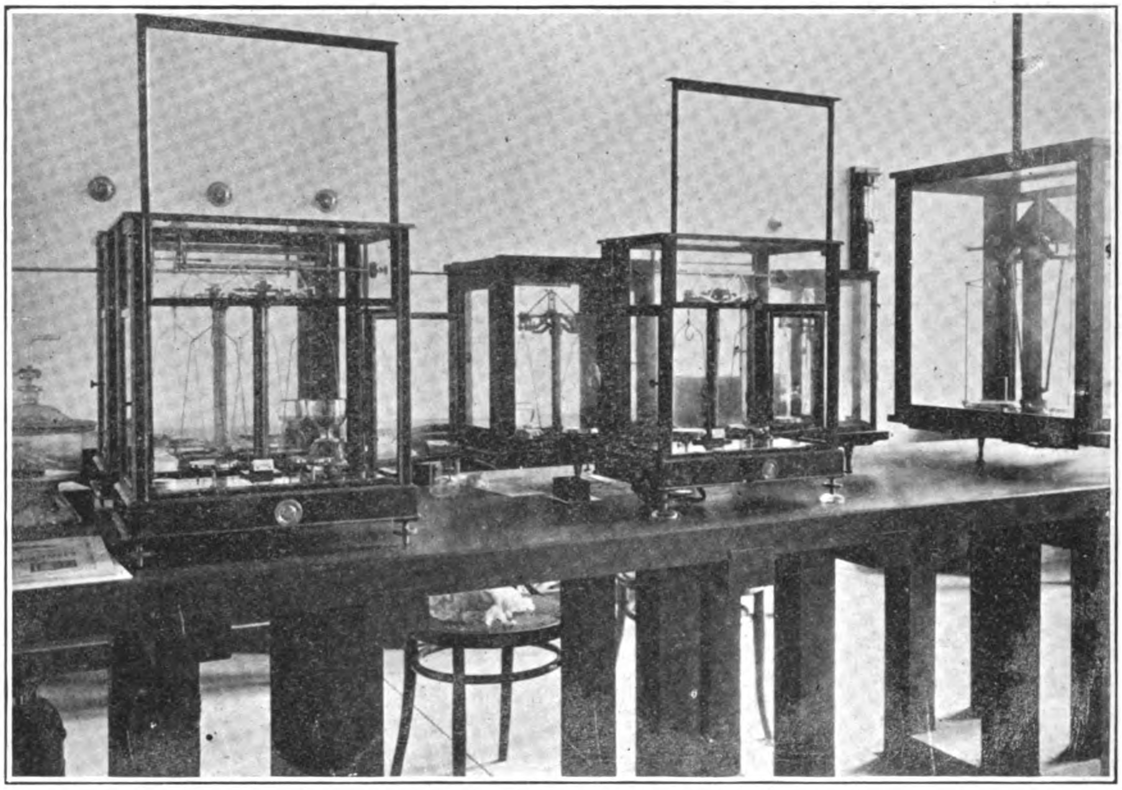
VACUUM DRYING AND DISTILLING APPARATUS, ETC.

that each desk is supplied with light and electric power, provided the motors to be used do not exceed one-sixteenth horsepower. Where greater power than this is necessary, separate lines have been run into the building. The storage-battery current is supplied only to those rooms where presumably it will be necessary; for example, those for mineral analysis, physics, and weights and measures, the spectrum analysis room, and the private laboratory of the superintendent of government laboratories.

DESK ARRANGEMENTS IN THE INDIVIDUAL ROOMS.—The general plan and assignment of the rooms has been mentioned above, so that only a description of the individual arrangements is necessary . As these vary but little throughout the biological and chemical wings, a description of one room for each section will, with few exceptions, do for the others. In the biological wing a microscope table 32 in. above the floor and 30 in. wide is provided along the entire available window front. Each one of these contains two small sinks let in at convenient points, and is furnished with water and gas. Those portions of the tables directly facing the windows are not supplied with drawers, the latter being provided in those sections which presumably, by reason of their not being directly centered behind windows, would not be used for microscopic work. The windows have been placed approximately 16 in. above the level of the desks, so that the strong breezes which prevail in this country would not play havoc with the materials on the work table, but at the same time the light is ample. In the center of each room devoted to biology is a large double work desk supplied with gas, water, and vacuum, with a large sink and drip board at one end. These desks are 36 in. high and are intended for the general work of the laboratory, providing facilities for heating, filtering, distilling, etc. Each one of these central tables has closets underneath and drawers. To one side, along the wall of each biological room, is a chemical work table furnished with gas, water, and vacuum connected with a sink and having a trough extending the length of the desk; the opposite wall is occupied by a hood 8 ft. in length, equipped like the side desk, which will supply facilities for work with such materials as should be excluded from the general laboratory air. Each hood has a separate flue extending up into the attic and



ASSAY ROOM.



ONE OF THE BALANCE ROOMS.

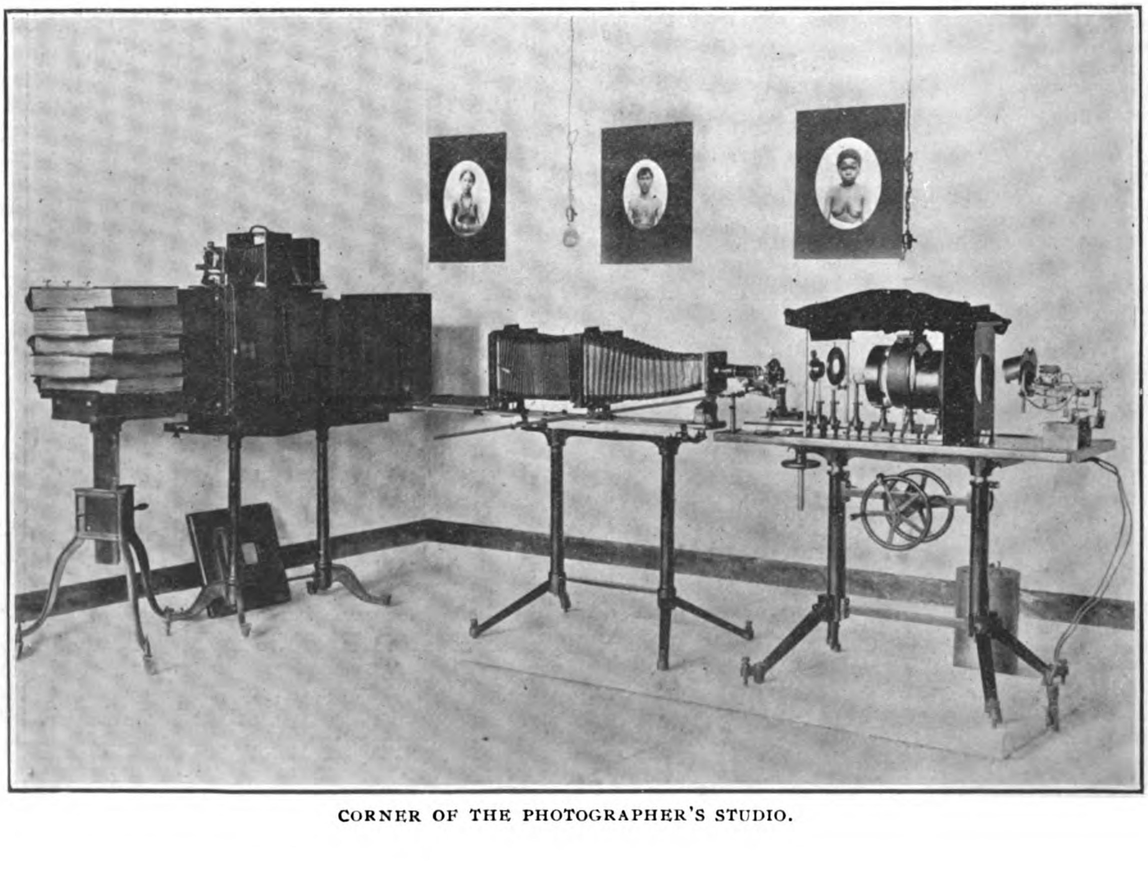
connecting with the main trunks in the exhaust, so that ample draft will be provided. The hoods ase supplied with gas, water, vacuum, and sinks.

An exception to the general arrangements outlined above is found in the room on the ground floor devoted to the preparation of culture media. In this there is provided steam for use in connection with the autoclaves and sterilizers, as well as gas, water, and vacuum. The main autoclaves of the building, for the use of the biological laboratory, are placed in this room in which all of the culture media is prepared. It has the usual window desk and hood, but in place of the central work desk there is provided a heavy, square table intended to serve in preparing the various media

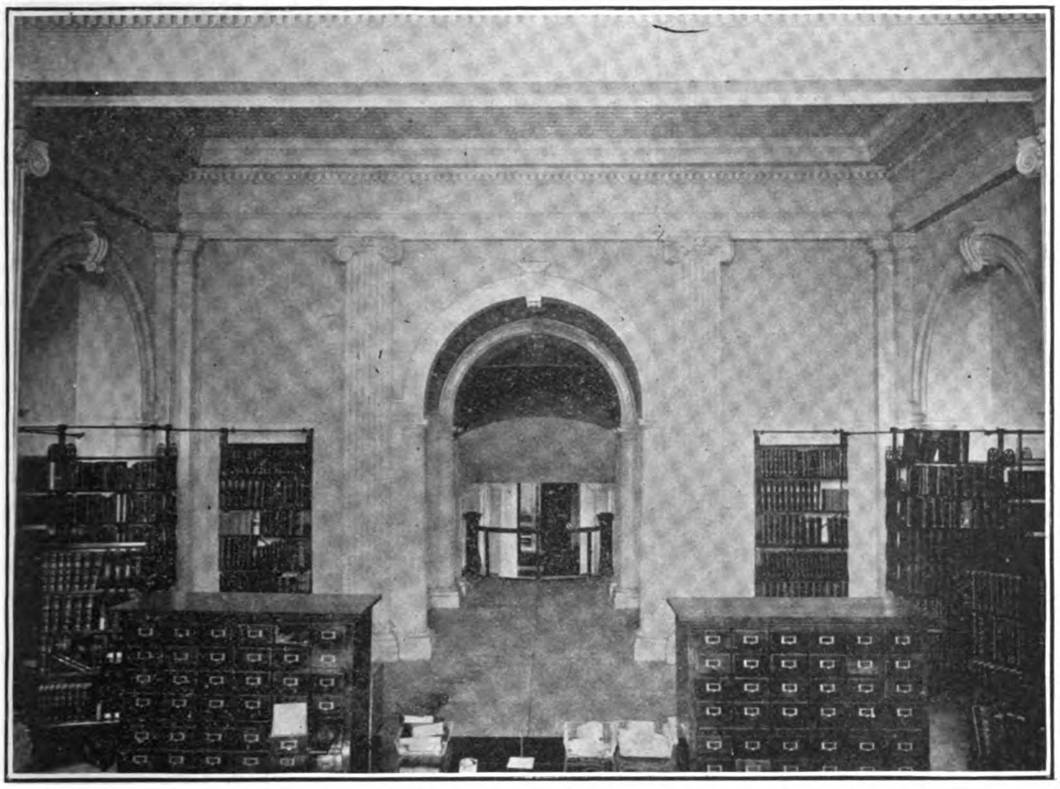
The rooms for the botanists are not provided with the side tables and hoods. In their place the glass-front herbarium cases are mounted one above the other.

On each floor of the biological wing there is a room 10 ft. wide and 24 ft. long for the purpose of accommodating the refrigerating boxes and the incubators. The former are cooled by coils provided from the cold-storage equipment and are built in two sections, so that one portion may be kept at any temperature within the capacity of the plant, whereas the other may be regulated at 20° to 25°. The incubators are in the form of large boxes with a central door and shelves around the sides; they are 7 ft. long and 3 ft. wide, and are heated by Bunsen burners. Electric heat for the incubators is planned to be installed in the future, but it can not be operated successfully until after the hospital buildings are constructed, because it is not intended to run the power plant day and night until the necessity arises. The incubator rooms also have in them, attached to the walls, the smaller thermostats for heating paraffin for sectioning and smaller incubators for varying temperatures.

It is not intended to have any great number of smaller animals for experimental purposes inside of the building, and for convenience the house for guinea pigs and rabbits has been placed immediately to the rear of the biological wing. It consists of two large rooms, together with two smaller ones for operating, and a vestibule. One of the large rooms is to be devoted to the storage of animals and to the



CORNER OF THE PHOTOGRAPHER'S STUDIO.



CENTRAL ROOM OF THE LIBRARY.

keeping of those which are under observation but not infected with dangerous diseases. The other large room is completely isolated and screened and is intended for work with plague, smallpox, cholera, and other diseases which may become dangerous and which it is not safe to handle unless every precaution is taken.

On the ground floor of the biological wing one room is set aside for the mechanic. This is provided with power and a complete equipment of lathes, shapers, drills, grinders, and tools, so that the laboratories will be in a position to have their instruments made and repaired on the grounds.

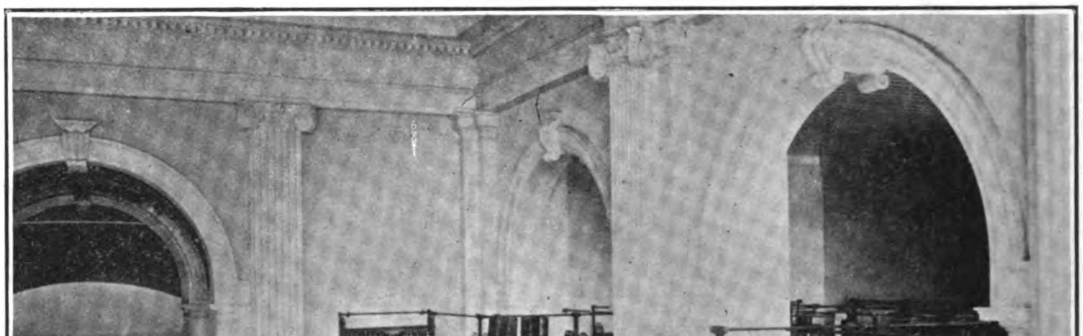
The rooms of the chemical wing show much greater variations among themselves than do those of the biological portion, because successful chemical work needs a greater variety of apparatus and facilities. However the distinction between the biological and chemical laboratories of the present time is not so great as it formerly was, because biologists are now carrying their investigations into fields more closely allied to chemistry. Therefore the general desk arrangement of the chemical rooms is similar to that of those devoted to biology. They each contain a window desk, which is 36 in. high and 30 in. wide, built without the central small sinks but in their place equipped with a trough, sink, drip board, gas, water, and vacuum for general chemical work. In some of the rooms, especially those devoted to mineral analysis, sugar and foods, etc., one end of this window desk is left free without incumbrance of any kind, for the purpose of permanently placing burettes for making titrations. The central large laboratory desk is placed in most of the chemical rooms just as it is in the biological laboratory, with this difference, that it has two central troughs connected with the large sink, is equipped with a reagent shelf in the middle, and is provided with the usual connections throughout its length for compressed air, water, and vacuum.

The hoods in the chemical laboratory are of necessity much larger than they are in those portions of the building devoted to other work, some of them being 9 and others 12 and even 15 ft. in length. The size of the flue for each hood is calculated so as to equalize in all the time necessary to effect a change of air; throughout the building they are provided with rising sash and glass fronts and sides.

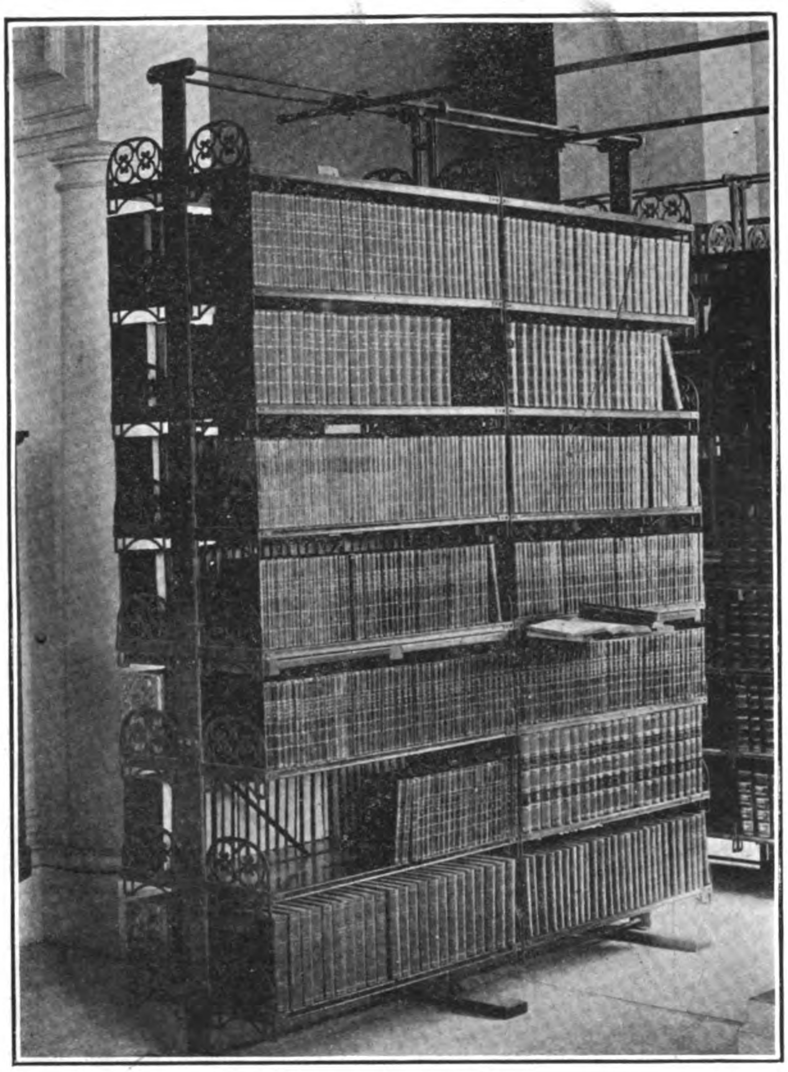
All the hoods in the chemical wing have not only gas, water, and vacuum but also steam and steam-exhaust pipes, so that evaporations may be continuously carried on without vitiating the air of the rooms. The wall tables opposite the hoods are equipped much in the same manner as are those in the biological wing, but a number of them, in rooms where this is necessary, have pipes for air pressure and steam as well. Storage-battery connections are found on the desks of the rooms devoted to mineral analysis, physics, and weights and measures, spectrum analysis, and in the private laboratory of the superintendent. It is intended to utilize electrolytic methods of analysis to the fullest extent when the building is in complete operation, and as in this class of work it is necessary not infrequently, owing to acid fumes, to have the apparatus set up outside of the general laboratory air, these connections were also placed in the hoods.

Certain rooms devoted to specific purposes vary somewhat from the general type. On the ground floor entering from the E. the first one to the right is devoted to physics and physical chemistry. It is provided with a large central pier with cement posts above and a top 8 in. thick, built upon a foundation which extends 3 ft. below the level of the ground, provided with a broad footing and carried up entirely clear of the building. At a distance of 10 ft. from the main pier and on each side is a secondary one brought up from the ground in the same manner, the group of three forming a triangle. All of the stability necessary for electric and other work is obtained by this arrangement. On one side of the main physics room is an ordinary wall desk supplied with gas and water for the purpose of electric conductivity measurements and physical chemistry. It is provided with storage-battery connection and is to have a large permanent thermostat tank attached to one end. Back of this main room to the E. and connected with it by a doorway is a second one. It contains the ordinary wall desk and hood and is intended for the usual chemical work so necessary in a physical laboratory. Finally, to the E. of the two just mentioned is a third for photometric work. It contains a long and heavy photometric table placed upon piers built in the same manner as the ones which have been described. The facilities in the division of weights, measures, and physics will be such that all classes of work needed in the adjustment of the weights and measures of the Islands can be carried on.

Across the hall from the rooms intended for physics and weights and measures is a large room to be used as a place for studying commercial processes. It has the usual central work-table and a long hood. One of the walls, differing from the general usage in the building, is occupied by a table on which are placed the shaking and stirring machines necessary for much of the work to be done in connection with the extraction of organic products. These machines are operated by a motor of ½ h. p. and are belt driven. The window desk is intended for distillations in which ether and other volatile inflammable substances are used, and as a consequence gas has been omitted from it, the heating being by means of steam only. At the E. end is an alcove in which are placed various machines to be used in studying com-



EAST ALCOVE OF THE LIBRARY.

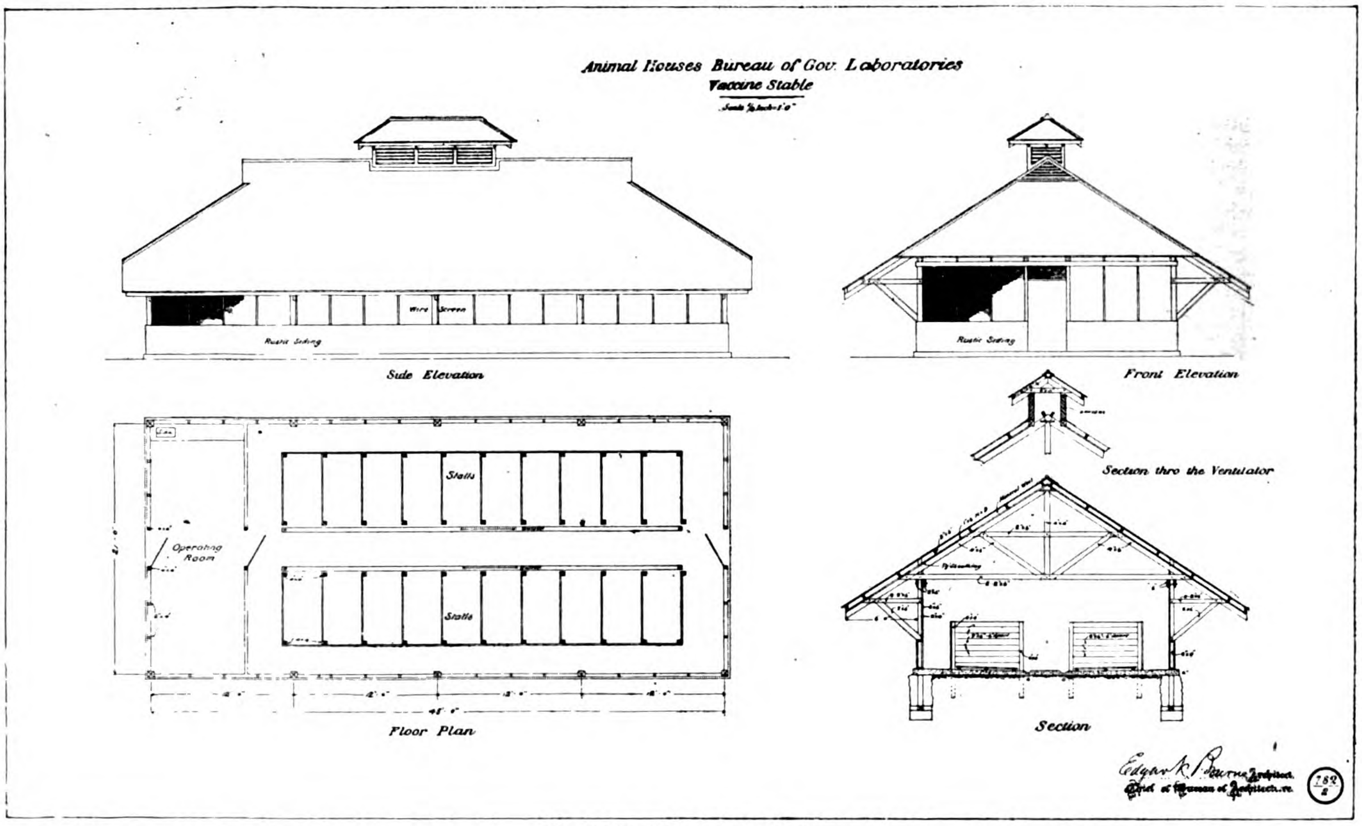


METAL STACK IN THE LIBRARY.

mercial processes. They consist of a copper still of 90 liters' capacity which is supplied with a steam jacket so arranged that either indirect or direct steam may be used. The apparatus is supplied with vacuum connections, so that materials may be distilled *in vacuo* as well as under atmospheric pressure, and a double stopcock for the extraction of samples without interfering with the vacuum is attached. Next to this still stands a large extraction apparatus consisting of a boiler of 140 liters' capacity for the solvent. From this and extending to the extreme top is the exit tube connecting with the condenser, which is at the highest point; below this and between it and the still is mounted a receiving drum for the condensed solvents, and farther down and to one side is the extraction apparatus proper. This consists of a large kettle of 100 liters' capacity, steam jacketed to use heat if necessary, containing baskets for the placing of materials, and mounted on trunnions so that it may be tilted to empty and clean it. The entire apparatus is fitted with vacuum which is connected with the condenser above and the trunnions are so arranged that steam may be admitted through them into the extractor, which is fitted with the necessary safety valves to prevent accidents. A smaller still of 15 liters' capacity, on the same model as the large one, is also provided. All of this apparatus is of the make of Gustav Christ, of Berlin. In the alcove of this room besides the apparatus given above there are mounted a porcelain ball mill for the pulverizing of refractory materials and a drug mill for grinding, both operated by a one-half-horsepower motor with shafting and belting, a hydraulic press and a vacuum drying apparatus, the latter of the make of the American Vacuum Drying Company.

Crossing the hall and immediately to the west of the room for physics is the assay laboratory. This is provided with a large firebrick table mounted on a pier and holding the main assay furnace from Braun & Co., Los Angeles, Cal., supplied with Cary hydro-carbon burners, the gasoline tank being placed in the ground outside the building so as to avoid all danger from fire. On each side of the main furnace are smaller ones, both muffle and crucible, of the Hoskins type. The main assay flue extends from these up to the roof and 15 ft. above the latter. The corner of the assay room next the furnaces is occupied by a Braun crusher and pulverizer and a Bonnot ball mill, both operated by a 1 h. p. motor with shafting and belt. In the center of the room is a pier for the rolls and a large table for general work with samples. The other arrangements are like those of the chemical laboratory in general.

Next to the assay room is a balance room for the general use of the ground floor and for the button balances, and leading from this is



TYPE OF ANIMAL HOUSES.

the combustion room for organic ultimate analysis, containing two combustion tables and one side table supplied with gas and water for the bomb furnaces.

The storerooms are two in number and are provided with shelving extending from the ground to the ceiling. One room is intended for chemicals and the other for apparatus, the former being supplied with a small laboratory work-table and hood and a distilling apparatus connected with the main boilers and to be used for the purpose of making distilled water.

In the chemical wing on the second floor the only variations from the general type are found in the room to the east and farthest along the corridor, in which is placed a special desk with compartments for the polariscopes, and in the main balance room. The latter has one central pier running from the ground up and constructed in the same manner as the ones described above. Upon this is placed a heavy balance table capable of accommodating eight instruments.

The photographer's room on the second floor immediately to the left of the main staircase is fitted with two dark rooms 8 by 10 ft. with large leaded sinks, drip board, shelving, and tables, and on one side is the stand for the photomicrographic apparatus. This is built on a solid pier 10 ft. long and 30 in. wide, constructed on the same principle as the others in the building and placed well into the ground on broad footings. The photomicrographic apparatus is of the latest Zeiss pattern, both stand and camera, and the source of light is a 90° Thompson arc light. The photographer is also supplied with 5 by 7 Graphic cameras with Zeiss series and A lenses, an 8 by 10 camera with Zeiss lens, as well as a Goertz anastigmat and enlarging camera and an apparatus for making lantern slides.

The library consists of a main room connected on either side with the stack rooms. The librarian's desk is placed in the center with the various files on either side, the reading room is in the alcove, and the book stacks are arranged on either side in the wings of the room and in the stack rooms. They are metal and of the type supplied by the Library Supply Company of Boston.

The serum laboratory in the power house has the same general arrangement of desks and hoods as the biological portion of the building. It needs no special description, with the exception of the serum kitchen, which contains a large, steam-supplied autoclave and sterilizer of the pattern made by Messrs. Bausch & Lomb, and a centrifugal from Lautenschlager, of Berlin, the latter driven by a 4 h. p. motor. The serum laboratory also is provided with two large incubators of the same type as those used in the biological division. The vaccine stable is placed immediately next to the power house. It is fly-proof throughout, with cement floors and stalls for twenty calves and an operating room for inoculation and for collecting the virus. The calves in this place can be kept under thoroughly aseptic conditions. On the other side of the power house is located the building for small animals. The guinea pigs and rabbits will be kept in galvanized-iron cages placed on racks well in the center of the room to insure coolness. To the rear of the driveway is a horse stable of a capacity sufficient to accommodate twelve horses, fly-proof, as in the case of the building for vaccine calves. It contains an operating room which will make it possible to collect serums according to the most improved methods. The last building of all is a small, two-storied one for dogs, goats, and monkeys.

Apparatus and Supplies.—In Manila the greatest difficulty encountered by a laboratory is to keep on hand a sufficiency of special supplies, and also to provide the apparatus which may be necessary. While the equipment may apparently be complete, nevertheless requests for new clasess of work may suddenly bring the laboratories face to face with the necessity of purchasing new kinds of apparatus, and until these are delivered of refusing to do the work demanded. To procure stores from Europe or America takes at least seven months. As a result the equipment of a laboratory at such a distance from the base of supplies must be somewhat more extensive and complete than it would be in Western countries, because when the emergency arises it is not possible immediately to procure the materials necessary for the work.

A large portion of the special apparatus has been mentioned in the course of the description of the building, so that only a brief review of the remaining equipment will be necessary. The laboratory is supplied with fifteen microscopes of the best pattern from Zeiss, of Jena, and with two microscopes for travelers from Leitz. All the necessary lenses to equip these instruments for ordinary work are at hand, and in addition there are a certain number of apochromatic 2-millimeter aperture 1.30 and 1.40 lenses. Ocular and stage micrometers, Abbé drawing cameras, and other accessories are of necessity a part of the equipment. The microtomes were bought from Schanze, of Berlin, and are five in number, besides which there are two Minot automatic instruments and one using carbon dioxide for work with frozen sections.

The incubators are of the manufacture of F. & M. Lautenschlager and are divided into two classes—the portable ones for the individual rooms and the larger ones. All the necessary apparatus for work in preparing sections is also at hand.

The museum is amply supplied with jars of all sizes, and the storerooms contain the necessary surgical instruments, post-mortem sets, and other appliances necessary for biological work.

The chemical balances are of the make of Sartorius, of Goettingen, and of Rueprecht, of Vienna. There is one precision balance weighing to 5 kilograms and another to 10, to be used in the standardizing of weights and measures. Both of these are of the make of Sartorius. The laboratory has also a normal kilogram and a normal set of weights from 500 grams downward from Rueprecht, and a chief normal thermometer from A. Haak, of Jena, from whom all of the laboratory thermometers have been purchased. It is also provided with a complete set of normal specific-gravity apparatus, alcoholimeters and other appliances for work with specific gravity. Apparatus for electric conductivity measurements from Goetze, of Leipsic, has been purchased, as well as normal volume measures from the same firm. An electric furnace for 300 amperes current for obtaining high temperatures is also a part of the chemical equipment. The necessary routine apparatus, such as flasks, beakers, Petrie dishes, evaporating dishes, platinum ware, retort stands, lamps, filtering apparatus, vacuum distilling flasks, condensers, etc., have been bought in sufficient quantity to meet all probable demands for the year, so that the laboratories are well equiped to meet emergencies. A detailed list of all the apparatus in the building would be too extensive for this article, nor would it be necessary, because the outline given above is sufficient to indicate the nature of the equipment.

JAPANESE ENGINEERING

Professor Robert H. Smith, a well-known British educator, presents a most interesting article on the progress of engineering science in Japan. After adverting to the alarms, which experience has shown to be baseless, exhibited as to the "national perils" within the past few years, Professor Smith says:—"The present article is written to sound the note of alarm of the new peril, which is a real and genuine one. This is the birth and rise of a new mechanical science in Japan, which will soon transform our Old World machinery into unusable antiquities if our Scottish and English and German and American engineers do not gird up their loins and educate themselves to a really scientific standard in the design of machines. We must throw overboard the hoary simplicities of Molesworth and Kempe; we must no longer be dumb, faithful followers of rule-of-thumb instead of reason and observation; for fetish worship at the altar of formulas we must substitute commonsense consideration of practical requirements; we must abandon the habit of 'assuming' a hyperbola to be a straight line 'for the sake of simplicity in calculation' merely because somebody said 80 yrs. ago that it appeared to be not very far out of the straight; we must study economy and efficiency with dead-hard scientific accuracy, and those who decline to take the trouble to do so must be requested to step off the manufacturing stage. It is, of course, a troublesome programme to set before a nation, who has never 'passed' beyond linear equations of a single unknown quantity, but there are so many unknowns in nature and so many degrees in art that those who will not move beyond the simplicities of last century must certainly succumb to the new yellow science of mechanical manufacture. There is yet time to escape the peril, because although the baby is already clever with his tools, he is not yet endowed with any abundance of reserve strength or capital." Reviewing a series of the proceedings of the College of Engineering in Tokyo, Professor Smith pays these the highest compliments for their ability. In particular he refers at length to a work by Mr. Inokute, professor of mechanical engineering in the Tokyo University, of which he says:—"Considered as an essay in the application of mathematics to a technical problem of the highest practical utility, taking account, as it does, in the most thorough manner of all the physical phenomena involved by help of the best physical *data* at present available, and working from the basis of the ***maximum*** possible physical efficiency being desirable, this paper by Professor A. Inokute deserves to rank as one of the greatest achievements ever attained in skilled calculation. Although the substance is difficult, the style is eminently simple, direct and free of ambiguity, so much so that to those who are able to read it is a genuine pleasure to do so. The aim of the whole investigation and of the new designs of centrifugal pumps that results from it, is the same as that more or less attained in the modern high-lift centrifugal pumps of Sulzer and of Mather and Platt, but the method of attainment in the design is quite different, and we doubt whether in either of the European designs is there to be found any such skilful effort towards minimization of losses."

HOW TO SECURE TRADE IN CHINA

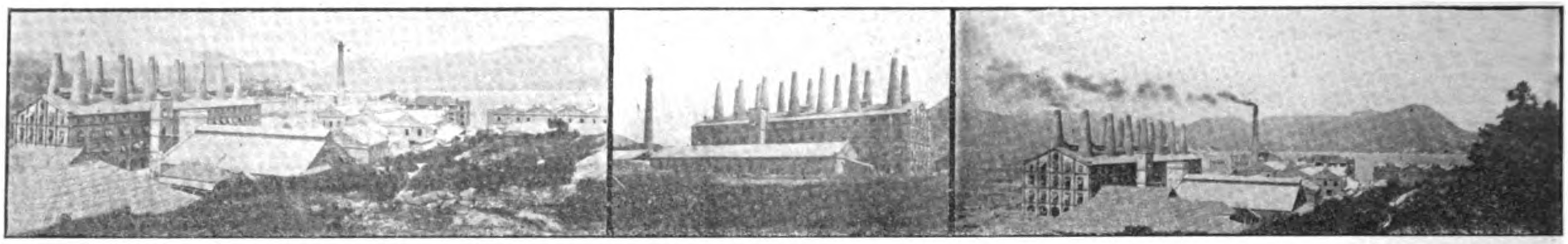
Consul Anderson, of Amoy, says the best way to obtain and to hold Chinese trade is by selling goods as cheaply as possible, always offering the best quality possible for the money. It pays to sell goods of full value in the Far East, and it would be unfair to the American business men to say that they have greatly erred in not doing so. It is a fact, nevertheless, that one of the strongest obstacles to be overcome in stimulating foreign trade in China is the fact that Chinese in the past have bought cheap foreign goods, have tried them, and have found them wanting. Goods of all classes to be sold in China must be cheap. The people can not buy them unless they are cheap; but this cheapness should not be obtained at too great sacrifice of quality. This is especially true of goods like cotton goods, of which the Chinese themselves have been manufacturers for ages. It certainly will not pay to send shoddy goods to China at any price. It might bring temporary trade, but the policy will react strongly and more will be lost than has ever been gained.

PROGRESS IN KOREA

Everywhere in Korea, according to a consular report, progress and prosperity are marching hand in hand. Natural hindrances to trade are being overcome by scientific methods worthy of the W. or by expedients worthy of the E. For example, the shallowness of the river at Chemulpo long hindered the arrival of large vessels. This is to be obviated by running rails over bridges to two islands near deep water. The work is being done by the Japanese. Trains are to run from the mainland alongside of steamers docked on the deep-water side of the islands. Rocks have been blasted, piers, docks, wharves, etc., built at great cost; but it is believed the increase of business expected will more than make up for any probable expenditures. The latest population figures give Korea 6,000,000 souls, including Ham Keung, a province in the N., under Russia before the war. Seoul, the capital, has 200,000 and is constantly increasing. There are 50,000 Japanese in the kingdom.

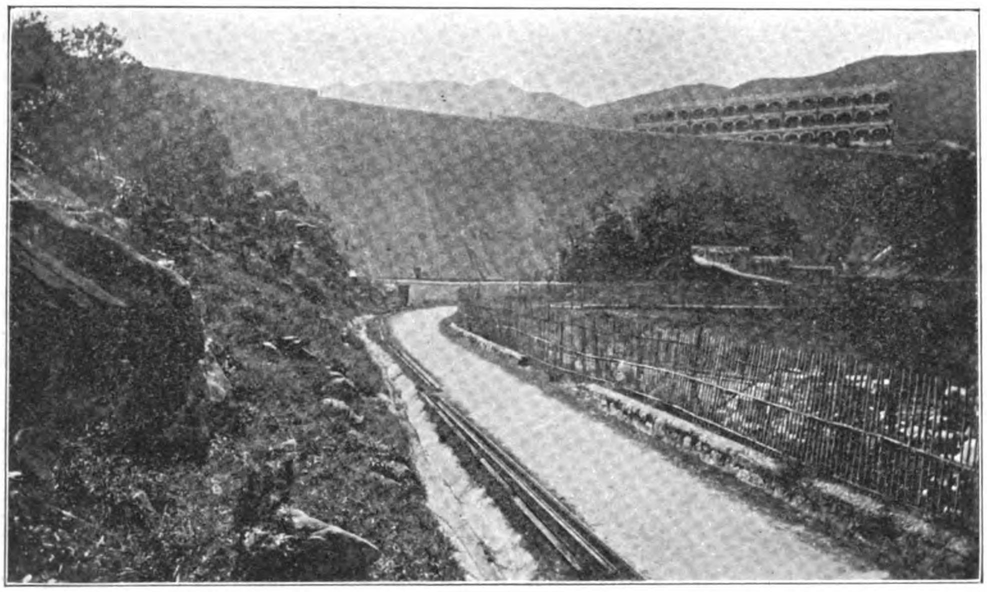
INDUSTRY OF THE GREEN ISLAND CEMENT COMPANY, LTD., HONGKONG

(Messrs. Shewan, Tomes & Co., General Managers)



HONGKONG WORKS OF THE GREEN ISLAND CEMENT COMPANY, LIMITED, SHOWING KILN HOUSE IN THE CENTER.

Among the most interesting of the pioneer industries of the Colony of Hongkong are the Portland cement works of the Green Island Cement Co., Ltd., of which Messrs. Shewan, Tomes & Co. are general managers. The product of this plant is of the highest grade, and its excellence has long been recognized by the British



DAM BUILT AT HONGKONG WITH GREEN ISLAND PORTLAND CEMENT.

Government, the War Department of the United States, the Philippine Government, and private contractors throughout the Orient. At all points in the Far East, including the Philippines, docks, bridges, fortifications, harbor improvements, etc., are being constructed with the "Green Island" brand of Portland cement.

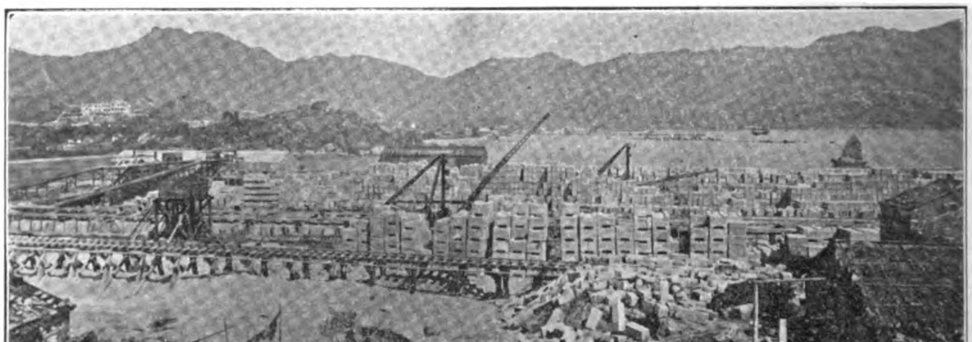
The Company began the manufacture of its cement at Green Island, near Macao, a little more than 15 yrs. ago, and the demand for the output grew so rapidly that in 1899 a much larger and more modern factory was established in the Colony of Hongkong on the Kowloon side of the harbor, where it stands today. Changes for greater efficiency of manufacture have been many since that time, and even now the company's works are in a state of transition. The ever-increasing demand for "Green Island" has rendered further plant necessary, and that to be installed—for which capital was recently authorized—will be of the latest and most improved design.

The limestone used in the manufacture of "Green Island" cement is obtained near Canton and the clay near Macao, and these materials are transported to the works in junks. From the wharf the stone is conveyed by means of overhead buckets to the company's yard, where it is dumped in heaps, as desired, for future use. From there it finds its way to the crushing mills, of which there are two. They have a capacity of 8 tons of stone each per day. One mill reduces the stone to about the size of road metal and the second mill further reduces it to about the size of peas. It then goes on edge runners where it is ground into coarse powder. The edge runners are heavy rollers working on a stationary bed and under which the stone is fed. The powdered stone passes on to the "griffin" mill where it is crushed finer still, and it is then elevated by means of lifts to the upper story of the building, where it meets the clay which has been ground up by a somewhat similar process, and each is weighed off on an automatic weighing machine. This apparatus is very nicely adjusted, and by an ingenious contrivance manages two buckets so that they are dumped directly the desired quantity is obtained, and then both are emptied together into the mixer. After being amalgamated, the compound is passed on to the tube mills, and, by means of flints inside of the mill, it is further pulverized.

The tube mill is an iron cylinder arrangement so that one end is higher than the other end and is half filled with flints. The grist is fed in at one end and it gradually finds its way to an outlet in the other end, being reduced to dust in the passage by the falling commingling stones. The powder obtained then disappears into another machine, where it is mixed with water and comes out in a continuous oblong strip which, in forcing its way along, turns a small cutting machine which slices it off into bricks. These are placed on iron trucks and are wheeled off to the drying tunnels. There are 12 of these tunnels which hold 18 trucks each and could treat 100,000 bricks per day. Trucks are pushed in by means of an iron runner which passes into the hot tunnels and out again as desired, taking the truck with it and leaving it in the tunnel. After about 18 hrs. in the dryer the bricks are ready to be fed into kilns, and taking the elevator one finds them stacked in at the top of the kilns. One floor below stokers are hard at work attending to the fires, which require looking after every 6 hrs. Long iron bars are used for making a hole down through the mass of coal and bricks. These cause a collapse, and the burnt stuff falls underneath. Fresh coal is fed to the fires,, and a story below more stokers are at work with their rods in the direction of the men above. The bricks force themselves down through the fire by their own weight. This causes them to break up and at the bottom of the kiln men are busy taking away the product.

The kilns are 14 in number and are of the Aalborg type.

The product of the frying tunnels is placed in a large store where it lies for some time, the result of several days' work being mixed together to keep the cement of uniform quality. It is



MA TAU KOK BLOCK YARD, HONGKONG.—THE BLOCKS SHOWN ARE MADE FROM GREEN ISLAND PORTLAND CEMENT FOR THE NEW ADMIRALTY DOCK IN HONGKONG. ONE HUNDRED THOUSAND TONS OF THE PRODUCT WILL BE REQUIRED FOR THIS WORK.

next placed in trucks and taken into an adjoining building where the trucks are elevated by means of an endless chain and emptied into ball mills where the grinding commences again. The ball mills grind coarse, and the tube mills, which come next, fine. The powder produced is fed into specially constructed trucks and is wheeled away to the bins, where it is stored until ready for packing. From time to time samples of the powder turned out by the last mill are taken and removed to a room specially set apart for testing.

Bags for putting up the cement are purchased, but the casks are made in the company's own factory.

The motive power for the whole of the works is provided by 5 Babcock & Wilcox water-tube boilers, which work up to a pressure of 180 lbs. to the sq. in. A Green's economizer is fitted so that the smoke and fumes are used in heating, and the water is fed into the boilers at boiling point. A 500 h. p. engine drives the machinery used in treating the raw material, and a 350 h. p. triple-expansion engine for all purposes connected with the cement. In the corner of the engine room are pumps which provide the water for the hydraulic lifts. The supply from these is regulated by the pressure of a piston carrying a weight of 50 tons. Throughout the works the lighting is with electricity.

The company's factory occupies an area of 1,000,000 sq. ft., and in round numbers the plant in use cost $1,000,000. When the factory was first started, at Green Island, the output was 1,000 tons per month; now 4,000 tons per month are produced at the Kowloon factory, and 2,000 tons at the Macao plant, where four kilns are being operated. New rotary kilns, now being installed, will reduce the time required for burning to 1 hr., and they will increase the output by at least 3,000 tons per mo. These kilns will work on an entirely new principle, being round like long cylinders, and will burn the material by having coal dust blown into them.

In the factory during the busy season from 1,600 to 1,800 men are employed, and taking into consideration shipping and the getting of limestone and clay, the industry provides not less than 3,000 men with employment.

CANTON-HANKOW RAILWAY

Viceroy Chang Chih-tung of Canton has reported to the Peking Government, according to an influential Chinese newspaper, on the loan he has raised from Great Britain to restore the Canton-Hankow Railway. The résumé of the report reads as follows:—

J. P. Morgan's syndicate in the United States proposed the restoration of the Canton-Hankow Railway to China by the payment of the sum of $6,750,000 to be paid in three installments within 6 mos. The sum of money required for these payments has been obtained from British authorities as a loan to China bearing interest at the rate of 4½ per cent *per annum* for the term of 20 yrs. without discount. The securities for the loan are the revenues from opium in Hupeh, Hunnan, and Kwangtung, etc.

Besides the above there is said to be a separate agreement which is not reported by the viceroy to Peking, which contains the following items:—

1.—Half of the engineers for the construction of the line shall be British.

2.—In case any further loan is needed for the road the British shall have the first opportunity of subscribing.

It is also understood that the viceroy has consented to have the engineering staff composed of half British and half Japanese engineers.

CONCESSIONS IN CHINA

(Concluded from October.)

[In its October issue, THE FAR EASTERN REVIEW *published the greater part of two most interesting and instructive letters on the foreign concessionary situation in China, written in 1898 for the London "Times" by its special correspondent, Mr. J. O. P. Bland, secretary of the Shanghai Municipal Council. The first installment of the correspondence concluded with a reference to the Hankow-Canton Railway, which has just been returned to the Chinese by the American interests which controlled the concession, and the ascension of a predominant Belgian interest in the undertaking. The concluding paragraph was a parenthetical observation of the writer, and read as follows:—"How that Belgian interest was secured in New York space does not permit here to tell, but the episode throws an instructive sidelight on the unseen political undercurrents affecting the question."—* THE EDITOR.]

The British and Chinese Corporation's enterprises may be divided into two groups—viz., the purely British concessions referred to above, and those which are held in combination with capitalists of other nationalities. In the latter class, since the elimination of the Han-kau-Canton line from the list, there are at this moment the Tientsin-Chin-kiang railway and the Nan P'iao coal mines. In regard to the former the German syndicate is understood to be determined to carry out this undertaking, and preparations are being made for the negotiation of the final contract without delay. German interests being preponderant, theirs will, no doubt, be the guiding hand; but nothing is yet known as to any proposed modifications of the preliminary agreement, of which the terms are similar to those of the Lu-han railway. That the German Government is in a position to deal (and does deal) with these questions in Shantung in a manner very different to that of ordinary diplomatic negotiations has been sufficiently proved. In the case, therefore, the British and Chinese Corporation is doubtless justified in waiting upon events and taking the gifts of the Teutonic gods in due season.

In regard to the Nan P'iao coal field, close to the Shanhai-kuan railway, work on this promising undertaking had to be abandoned during the Boxer troubles, and it is only quite recently that the district has quieted down sufficiently to permit the resumption of operation being considered. The corporation shares this enterprise with the Chinese Railway.

As to the purely British concessions at present held by the corporation as above described, there is little to be said, for the simple reason that since 1898 nothing has been done. On May 13 of that year the corporation signed a preliminary contract whereby they undertook to issue a loan not exceeding £3,000,000 (4½ per cent at 82) for equipment, etc., of the Shanghai-Nanking railway. The terms of the contract are not less advantageous than those of the Lu-han and other lines; the cost of construction (estimated after survey) is admittedly much lower, while the financial prospects of the undertaking are certainly better than those of any Chinese railway concession. The district in question, teeming with an industrious people, has not been affected by the recent disturbances, nor has the price of Chinese Government stocks (to quote the usual clause in these contracts) "been affected so as to render the successful issue of the loan impossible on the terms named." If there is any explanation of the Corporation's action it has not been communicated to the Chinese Government; to the latter it is a matter of surprise, frequently expressed, that the corporation should not have withdrawn from these contracts, as it is entitled to do, on the ground of "political or financial crisis in Europe or elsewhere;" but of such intention there has never been any indication. The Corporation has adopted a policy of procrastination but British in tenacity.

Urged to abandon this policy, the Corporation in December last informed Shing Ta-jen that the original contracts had become unworkable, and the draft of an amended agreement, to be applicable to all the purely British concession in the Corporation's hands, was therefore submitted for his consideration in December last. It is to negotiate in the matter of these proposals that ex-Consul-General Brenan, C. M. G., is now en route for China; but unless he is empowered greatly to modify their present terms, his mission is not likely to be successful. Apart from a marked omission to recognize the usual "face saving" conditions as to China's sovereign rights of representation and control, the financial terms named in the amended contract especially those referring to royalties and repurchase, are such that Sheng has declined even to discuss them.

It must be remembered that these concessions can not be alienated from British syndicates; international competition in regard to them is therefore precluded. Under these conditions the Chinese Government is naturally indignant at the nature of the demands advanced by the Corporation, and the latter's recent action in the matter of the restoration of the Pekin-Shan-hai kuan lines has, rightly or wrongly, intensified the bad impression already existing. It is to be hoped that since the British Government have rightly insisted on these concessions remaining in British hands, steps may be taken without further d ay to have them carried into effect and to eliminate from them every suggestion of un-British methods. Such is the actual position of affairs.

A few words now, in conclusion, as to the political aspects. I alluded at the beginning of the first of these articles to the apparent belief of the British Government in 1898 that railway construction by foreign Powers in China—and in China it is essentially Powers, not individuals, that stand behind railway construction—might mean "loss of orders" to British industry, but little or nothing to Great Britain. It is only fair to suppose that subsequent events have materially changed this easy-going view and that the serious political side of the question is now adequately realized in Downing-street. Railways in North China mean armed guards to-day; in Manchuria, but for certain unexpected contingencies, they would already have meant permanent occupation of three provinces. From armed guards to exclusive control is but a short step; to differential tariffs and "favored-nation" treatment a shorter step still. Already a "Chinese" railway is being used in Leaotong to carry goods into Chinese territory duty free, *i. e.* to defraud the Chinese revenue of its just dues and to kill the seaborne trade of a treaty port, Newchwang. Already on a German controlled railway of Shan-tung the Chinese Government mails are refused the ordinary privileges and courtesy shown to German mail matter by the Chinese Government elsewhere. The railways of China are and will be so many political claims pegged out by the Powers that build them. By the Anglo-German Syndicate's agreement for the Tientsin-Chinkiang trunk line, approved by both Governments, the British sphere of interest was defined to include the Yang-tsze Valley, the provinces south of Yang-tsze and the province of Shan-si. The spirit of this pact was shown in the German Claim, admitted and maintained, to "an entire monopoly of contract in Shan-tung." Since that date, however, German policy has neglected no opportunity of asserting a general "parity of rights" in the Yang-tsze Valley. The necessity for maintaining and carrying into effect those British concessions which the Government recognized as important four years ago has to-day become a matter of urgency.

As to the actual steps to be taken to this end, the question is one for the British Government to decide. If it is beyond the power of that Government to guarantee foreign loans, there are precedents which appear to afford an adequate solution of the difficulty.

If British syndicates are really unable, in open competition, to finance railways in China under existing conditions, the fact must be accepted, and once established, after proper investigation made, would furnish conclusive proof that the railway undertakings of other Powers are not bona fide commercial enterprises. But the Government which took "official cognizance" of the Peking railway loan of 1899, which was ready to guarantee Japan's military expenses in 1900, *and actually advanced funds to the Wu-chang Viceroy in the same year for his provincial exchequer,* should be able to devise means for lending a measure of effective support to those important concessions which, by its own action, have been proclaimed to the world as exclusively British.

CHINESE IMPERIAL MINT, TIENTSIN, NORTH CHINA

The new mint of the Imperial Board of Revenue (Hu Poo), at Tientsin, North China, was only recently completed and formally turned over to the Chinese authorities. For its size it is said to be the fastest mint in the world. The machinery is all of the latest type, and has been installed under the expert supervision of Mr. Lyle G. Emery, M. E., who was sent to China by the Treasury Department at Washington, D. C., to plan and construct the mint, at the special request of Viceroy Yuan. Mr. Emery had been superintendent of machinery at the United States mint, New Orleans, La., 6 yrs. prior to his transfer to China 3 years ago.

MACHINERY EQUIPMENT.—The Tientsin mint is equipped with 13 pairs of rolling mills. Seven of these have each a speed of 75 r. p. m., and 6 pairs attain each a speed of 85 r. p. m. The rolls are different in arrangement from those of any other mint in China in that they are all operated independent of each other. They are all belted and run from the crank-shaft of the engine, and any one of them can be thrown out of commission when necessary, thus avoiding a shut-down if any of them get out of order.

There are 3 punches each with a speed of 160 r. p. m., and as they punch 2 or 3 coins at each revolution they are good for from 320 to 480 coins per minute.

Five milling or upsetting machines are also installed, each supplied with 3 tubes for feeding coins. Each tube has a capacity of from 200 to 400 pieces of money per minute according to the size of the coins.

There are 11 presses in the installation, 7 of which stamp out 100 coins each per minute and 4 of which turn out each 125 coins per minute, or a total of over 650,000 coins per day of 10 hrs.

In addition the mint is supplied with all the latest improved facilities for melting the copper, cleaning the coins and coping with all the other little technicalities which arise in the process of minting money. The melting department is also something entirely new in China, and is a great improvement over the old methods in use in China in the past and at the present time. The crucibles of the Tientsin mint are twice the size of those in other Chinese mints. They are never taken from the fire until worn out. The metal is dipped from the furnace and poured into the moulds thus saving not only time but over 50 per cent of coke fuel.

STRICTLY AN AMERICAN MINT.—The Tientsin mint is strictly American in all its details. The mint machinery, consisting of rolls, punches, presses, milling machinery, shears and melting apparatus, were furnished by the Johnson Iron Works of New Orleans, La.; the engines, boilers, and transmitting machinery by the Vilter Manufacturing Company of Milwaukee, Wis. The engine is of the Corliss type of the latest design, and has a capacity of 250 h. p. under 80 lbs. pressure of steam, and of 390 h. p. under 100 lbs. pressure of steam. The boilers are the latest American return tubular, and are rated at 150 h. p. each. Three of these constitute the mint's boiler battery, and they can be used singly or collectively as necessity demands. The contractors of this plant are the well-known firm of Messrs. Arnhold, Karberg & Co., with Mr. William Pape, manager of the Tientsin branch, in charge, and like all the big contracts this firm has undertaken with the Chinese Government, it has carried out the erection of the Tientsin mint with great success.

CHINESE IMPERIAL MINT AT TIENTSIN.

ANOTHER VIEW OF THE CHINESE IMPERIAL MINT AT TIENTSIN, SHOWING STACK AND POWER HOUSE.

JAPAN'S GUNPOWDER PLANT

The most complete, modern, convenient, and practical gunpowder plant in the world is said to belong to the Japanese Government and is located at Meguro, near Tokyo. All kinds of ordnance and blasting powders are manufactured at this plant, and 500 men are employed. Every department has its allotment of space, but not a foot is wasted, nor is there anything superfluous about the massive buildings and their equipment. A narrow gauge railroad leads through the main street for the full length of the factory grounds, and overhead a wire-rope power-transmission connects all departments. Though modern in every respect, the plant is none the less Japanese in appearance. The corners of the roofs of the buildings turn up, and there are many details in every department carried out after Japanese ideas. Five or six thousand pounds of finished material is turned out daily, yet grounds and buildings are kept clean and neat.

RAILWAYS IN SOUTH CHINA.

The Canton (China) correspondent of *The North China Daily News* writes that while in the N. of China railway construction is being pushed forward, the energies of the people of the S. seem to be expended in mutual congratulations that the agreement with the American-China Development Company has been squashed, and the concession, rashly granted, bought back into the "safe keeping of the Chinese." Representatives of the Kwangtung millionaires were deputed to send congratulatory telegrams to Chang Chih-tung, by whose energy it appears the present arrangement was reached. The "famous" viceroy has in turn distributed shares of honor to whom honor is supposed to be due, and adds that the gentry of the three provinces must now put forth their best energies, and consider what can be done with a view to the inception of the work. The prevailing spirit appears to be one of exultation that the great undertaking has been wrested from the hands of the Americans, without any expressed regret that the work will be indefinitely postponed. The same spirit is manifested in Canton in regard to the projected line S. into Yunnan, which is to attach itself to that of the French Railway in Kungchaowan. Appeals have been sent to the Kwangtung viceroy at Canton urging that this line be undertaken jointly by the French and the Chinese. The suggestion, however, is rejected, without any hope that, with further discussion, it might be entertained. The reply affirms that the most important point to keep in view is that the officials shall have control of the line and therefore there can be no joint action with the French and Chinese. Thus the most powerful consideration, which is influencing the minds of the officials, appears to be not that railways shall be laid down as rapidly as possible, but that every conceivable hindrance shall be placed in the way of foreigners having anything to do with them, when, at some future time, the work shall be undertaken It would seem, therefore, as if there were some genius, evil or otherwise, at work in the S. whose influence is wanting in the N., and so while great things are being attempted there, nothing is being done in the S. except to "sit tight."

CHINESE ENGINEERING AND MINING COMPANY, LTD.

The shareholders of this company held their annual general meeting in London on Friday, October 27th, when the directors' report and accounts for the fiscal year ended February 28th, 1905, were submitted. The net result of the year's transactions showed a balance to the credit of profit and loss account of £153,355, made up as follows.

Net profit, after providing for all charges in China........		£204,398
Add balance brought forward from last year...	£1,396	
Gross receipts in London...	£5,690	
		£7,086
		£211,484
Deduct expenditure in Europe, viz:—Salaries, stores, etc.............	£6,085	
Debentures, interest.......	£27,794	
do redemption ..	£10,000	
Directors' fees......	£3,250	
Law costs estimated at.....	£11,000	
Leaving a net balance of. .		£58,129
		£153,355

Which the directors recommended should be appropriated as follows:

In placing to reserve for depreciation.	£40,000
In paying a final dividend of 1/-- per share (free of tax)...............	£5,0000
Making a dividend of 10 per cent for the year with the interim dividend of 1/--per share paid on 22nd June, 1905	£50,000
And carrying forward..................	£18,355
	£153,855

MINING IN FRENCH INDO-CHINA.

Official classification places mining operation in French Indo-China in three categories: (a) Mines granted with full proprietorship; (b) application for grants under consideration; (c) prospecting concessions. This classification is that adopted for Tonquin and Annam. It is somewhat different for Laos and Cambodia, which are not under the same mining laws.

In Tonquin the most important mines are: Hon-gay mine, owned by the Société Francaise des Charbonnages du Tonquin which employs about 3,000 workmen—Chinese and Annamites. The total output in 1903 amounted to 267,333 tonnes, compared with 316,618 in 1902. The financial position of the Société des Charbonnages du Tonquin is very flourishing. Another mine, the Kebao, is worked by the Chinese and Annamite contractors. The company is contented to sell the coal at a sale price above the cost of thus working. The output of the Kebao mine in 1903 amounted to 5,586 tonnes, and 1,463 tonnes during the first quarter of 1904. The Schoedelin mine has been worked by contract since October 1902 by the Heritiers Sarran. The approximate output in 1903 was 5,000 tonnes. A small railway, 3½ kilometers long, was constructed from the mine to the arroyo on which the coal is conveyed to Haiphong. Besides these, there are the Saladin mine, not worked in 1903, and the Tannhuan mine (lignite), which is situated about 3 kilometers from the termination of the Dong-giao, a little beyond Ninh-binh on the Hanoi-Vinh railway, to which it is connected by a recently constructed industrial railway. In 1903 three small excavations were made.

The metal mines are the following: Ste. Joséphine (gold, tin, silver, and mercury), Ste. Adèle (tin and gold), and the Beau Site (tin). These mines, lying in the District of Caobang (Nguyen-binh), are alluvial tin deposits. In the N. and W. they touch the foot of the imposing Pia-Ouac mountain, 2,000 meters high. Veins of quartz, with cassiterite and wolfram, are very conspicuous in the granulite countries, especially above the Beau Site mine. The metamorphosed schist and limestone also contain veins. The alluvions derive the useful mineral from the destruction of the veins. Ste. Joséphine mine is not at present worked. The Ste. Adèle deposit, better known by its old native name of Tinh-Tuc, is worked open cast by sixty Chinese. Sluices are used, and work is finished with pans; thus a little gold is separated from the cassiterite. Two smelting furnaces of the Banca type produce, in pigs of 25 kilometers, a very fine tin, which is sold in Indo-China and China. The total output of smelting since commencement of work is about 30 tonnes. The Beau Site mine employs fifty Chinese workmen. The ore is not treated on the spot, but sold at Singapore after concentration.

The most important prospecting for gold is that made in 1903-04 at the Moson alluvial gold mines. Until recently they occupied about 40 Muongs and 250 Chinese coolies. The latter have been disbanded subsequently to a mutiny. Some prospecting work—trenches or borings—was executed in 1903-04 in alluvial deposits, near the Pia-Ouac, within the perimeter of the Ganymede, for tin, and in various parts of the Song-Hiem Valley for gold. No auriferous or stanniferous veins have as yet been struck. In the Pia-Ouac district two veins, although their value is not definitely stated, may be mentioned. The first essentially consists of quartz containing wolfram. It is very distinct, and 1 meter thick, and lies in a rise some tens of meters long in a spur of Pia-Ouac, not far from Tinh Tuc. At various levels there are old galleries constructed by the Chinese mining for cassiterite associated with wolfram. The second is the Tong-Tinh vein, represented by traditions as an argentiferous quartz ore, which was actively mined. The outcrop is concealed, but the old Chinese workings, the openings of which are yet visible, seem numerous and bear witness to the existence of the deposit, which seems to be in contact, or nearly so, with the metamorphosed limestone and schist. To the S. of the Pia-Ouac, in the region of Ngan-Son, there are auriferous quartz veins with gold sometimes visible, now becoming known. These discoveries are in their infancy, and though no prognostications can be made for the moment, they deserve mention.

IMPROVEMENT OF CHINA'S HIGHWAY.

Everyone knows that the old highways of China, both on land and by water, are numerous, important, and neglected, says the *North China Daily News*. In the rivers there are often rapids, like those in the Upper Yangtsze, altogether beyond Chinese skill to remedy. In many other cases Oriental apathy contents itself with the aphorism that "water should be allowed to take its course," and seldom interferes. In the Yellow River, however, there is a periodical pretence of protection for the people, not because this stream is a highway, but because its inundations threaten the land tax from scores of counties. If its vagaries were radically cured by scientific engineering, hundreds of Chinese officials would annually be the poorer by scores of thousands of taels.

The Grand Canal is by far the most important of China's artificial waterways, extending from Hangchow, the southern capital of Kublia Khan, to Cambalu, the northern one, or rather to a city in Western Shantung, where entrance is made to a small but important river debouching into the "Sea River" at Tientsin. The excavation of this channel, while a most audacious undertaking for those "middle ages" when nothing of the kind existed in Europe, was a comparatively simple matter to a monarch who had the idea once formed and the labor to accomplish it. Its purpose was to provide an inland through route for the delivery of the tribute grain from Central China to Peking, at a time when sea voyages were difficult and uncertain. Advantage was taken of naturally lacustrine districts, the resultant commercial benefit to several provinces being immediate and permanent. Increasing use of steam navigation long ago abolished the usefulness of this great line for its original purposes, but it was only 3 yrs. ago that the last traces of this strange amalgam of rice transport combined with unlimited licensed smuggling was definitely suspended. As a result many lucrative posts have been abolished, and a considerable stretch of the canal (between the Yellow and the Wei Rivers) has fallen into complete disrepair and became useless. There are natural difficulties to be overcome from vagaries of the Yellow River, the gradual silting up of the canal, and the occasional transit of mountain streams across its course, with which Chinese engineering does not know how to deal. With indomitable Chinese patience, the crews of whole fleets of craft simply await the slow accumulation of water to float them in a "lock" 1 m. long between the gates, or else take a devious course through broad lakes where winds and waves may make travel difficult or impossible.

For the remedy of all this waste there are three requisites—enterprise, moderately honest officials, and funds. All three are lacking, and now that it is no longer a question of tax transport, the government takes no further interest in the matter. It is not otherwise with those land routes in distant parts of the empire. Long trains of pack-animals, coolies, and travellers thread these difficult, toilsome, and not infrequently dangerous, trails. But let a landslide or an exceptional freshet supervene, and the poor wayfarer will probably have to wrestle with fate unaided. Whose business is it where he goes, or when, or how? Some important mountain passes like that leading from Central Chihli to the capital of Shansi, or the one from Peking to Kalgan, are indeed sometimes improved, the former largely (or perhaps altogether) by private benevolence, a too frequent instance of practical public spirit. It is the great so-called "imperial roads" (yu lu), such as that from Peking to Central China through Paotingfu, or that from Peking to Nanking through Chihli, Shantung, and Anhui, that show the most utter neglect. Broad roads once lined with great trees have been worn down much below the surface of the adjacent land which thus drains into them, making them for months together shallow canals but impassable alike for boat or cart. During this period travel is suspended as in a polar night. When it timidly and with difficulty recommences, it is forced to make detours into scarcely less impossible country by-roads. After some months the winds and the sun—the only road contractors in China—have done what they can, the carts once more grind the dried mud into clouds of friable dust with which the air is filled, and business again looks up and content reigns. It is only the meddlesome foreigner who wants to know why "the governor" does not order "the district magistrates" to mend these roads. But what if he should "call spirits from the vasty deep," would they come? Alas! no, the D. M. would wait 6 mos. and then report that he could find no precedent for such action; that to elevate the road would take thousands of men hundreds of days, and would require tens of thousands of taels of silver. Where, too, is the earth to come from? Where is the road to drain to, since it is already a natural gutter? The people of his district are poor and ignorant. But they are also stupid and obstinate. They are already heavily weighted down by "foreign indemnity" (artfully expanded threefold by local manipulation); to compel them to wrestle with an interprovincial highway, would surely cause trouble. It is an "imperial highway," and nothing to them. Its condition is just as bad in the district on the N., and much worse in that to the S. The progressive governor may reply to the *argumenta*, but he can not create enterprise, honest subordinates, much less funds, and so the matter drops where it began. And there, for aught that we can see, it must lie indefinitely. For the inevitable railway tends, we fear, to postpone highway amendment into the remote future.

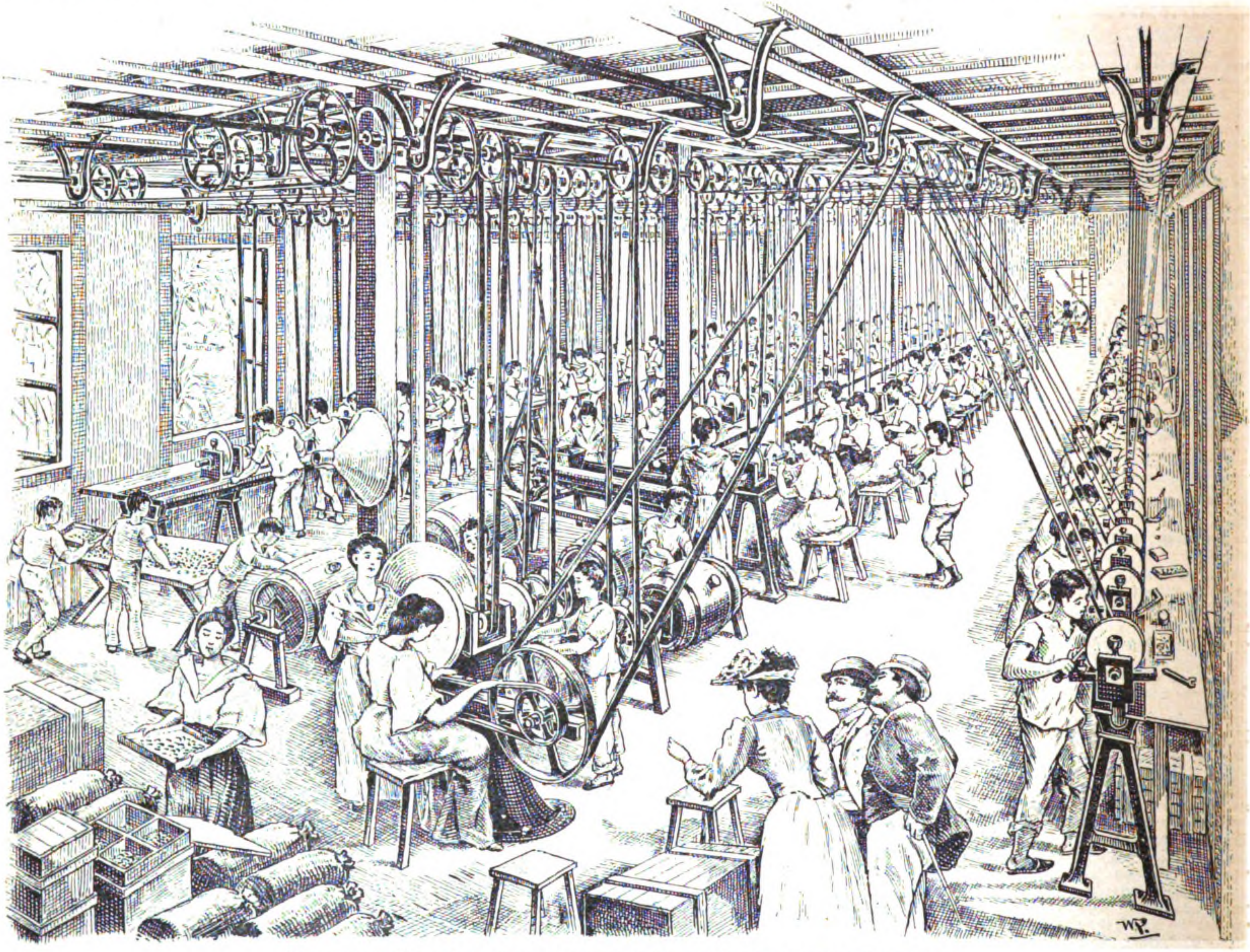
"LA CONCHA" BUTTON FACTORY, LTD., MANILA, P. I.

One of the growing industrial enterprises of Manila is that of "La Concha" Button Factory, Ltd., whose plant is located in the suburb of Pandacan on the bank of the Pasig River. The building is of stone and galvanized roof and its dimensions are 30 by 10 meters. It is equipped with 54 modern machines, which, together with all other machinery, were imported from Europe in 1904. The motive power is steam and sufficient for the installation of many more machines. The company began active operations in August, 1905, and since then a European foreman has taught, so far, 60 Filipinos how to operate the machines with the result that at the present they are capable of turning out 150 gross of buttons per day, only 50 gross behind the full capacity of the plant.

Just now the product of the factory is exclusively confined to mother-of-pearl buttons which are placed upon the market in every style and size. These buttons can be made here much cheaper than those imported from Europe can be sold, for the reason that the shells have to be exported from here to the continent, the buttons manufactured there and returned to Manila. Thus the freight, duties, etc., are eradicated from the pearl button business here when the trade deals with "La Concha."

Ever since the establishment of the factory the importation of mother-of-pearl buttons has greatly fallen off, and today this industry supplies nearly the whole needs of the market. The company is already on a paying basis. About ₱4,000 worth of buttons are manufactured monthly and over ₱6,000 worth of back orders can not be immediately delivered as there is not sufficient machinery. About ₱7,000 worth of buttons are used monthly in the Philippine Islands, and, to supply this demand, more machinery will be imported. It is also intended to manufacture buttons of bone and horn, the raw material for which can be had here at very low prices. For these buttons there is very great demand. There is a further demand for articles such as napkin-rings, teaspoons, handles for umbrellas, studs, hair combs, and all other fancy articles manufactured from mother-of-pearl, and while the company actually has orders for such articles it is unable to handle the business until the new machinery is installed. The company also has orders from Europe for sheets of mother-of-pearl, for the handles of pocket-knives, which can not be filled for the same reason. A great revenue is expected from these articles and also from the export of buttons in the rough, for which there is also demand from European manufacturers.

To make the output of the factory fully ₱12,000 monthly, so as to fill all orders for local consumption and export trade, the company has set aside ₱35,000 with which to purchase and install the extra machinery. With this increased facility it is confidently believed that a minimun dividend of 20 per cent *per annum* will be paid.



"LA CONCHA" FACTORY WITH A CAPACITY OF 30,000 PEARL BUTTONS PER DAY.

"La Concha" Button Factory, Ltd., has a capital stock of ₱75,000, and the following well-known business men of Manila compose the board of directors:—Dr. Benito Valdez, president; E. E. Elser, treasurer; Clement Schwinger, managing director; Carl Roeper, factory manager, and W. Partier, secretary.

NOTICE

Lloyd's Register of British and Foreign Shipping

The undersigned, having been appointed Surveyor at the Port of Manila, *vice* Mr. A. Forbes Greig who has resigned through ill-health, will carry on the work of the Society at the following address:

WILLIAM SWANN

Consulting Engineer and Marine Surveyor

OFFICE OF FINDLAY & CO. 25 PLAZA DE GOITI SANTA CRUZ, MANILA.

FAR EASTERN ENGINEERING AND CONSTRUCTION NEWS

RAILWAYS, SUPPLIES, ETC.

MASANPHO RAILWAY, KOREA.—This line has been opened to traffic.

KOWLOON-CANTON RAILWAY.—It is understood that British engineers will make the survey of this line.

PEKING-KALGAN RAILWAY.—Tenders are invited for the first section of this line, from Fongtai to Nankou.

TIENTSIN-CHINKIANG LINE.—An effort is now being made to induce the Chinese Government to build this railway instead of the Anglo German enterprise

PEKING KALGAN RAILWAY, CHINA.—The machinery and materials for the building of this line are to be imported free of duty, the request being granted by imperial rescript.

CHINESE EASTERN RAILWAY, MANCHURIA.—Japanese troops have formed a garrison for the protection of this railway. This duty is under the direction and control of the Governor-General of the province.

ANOTHER IMPERIAL RAILWAY, CHINA.—Owing to the frequency of the Empress Dowager's visits to I Ho Yuan, it has been decided by the Chinese Government to connect this place with Peking by rail.

FOREIGN RAILWAY SHOPS BARRED, CHINA.—No foreign railway shops are to be allowed at any of the stations along the Chentow-Hsihchiachuang Railway, and those already existing at these places are to be closed forthwith.

PEKING-HANKOW RAILWAY.—According to the native papers of Shanghai the opening of the Peking-Hankow Railway, with festivities at the new bridge over the Yellow River, was set for the 15th day of the current month.

BIG PURCHASES OF MATERIAL FOR JAPAN.—Six Japanese railway representatives recently arrived in Chicago, *en route* for England and Europe. It is reported that they will purchase supplies to the value of £6 000,000, chiefly from American and British manufacturers.

LUKOKIU-HANKOW LINE.—The railway from Lukokiu to Hankow, China, is nearing completion, but owing to the importance and magnitude of the work of bridging the Whang Ho, nothing will be done in this matter until after an inspection of the proposed site by high government officials.

ANHUI-KIANGSI RAILWAY, CHINA.—It has been suggested that money for the construction of railways between Anhui and Kiangsi might be raised by means of lotteries, but a censor has pointed out that winning numbers might fall into the hands of foreigners so the idea is not likely to be carried out.

FORMOSAN RAILWAY.—A telegram from the Formosa Government, according to the *Hongkong Telegraph*, states that the construction of the railway across the wild tract of country in the Giran District has been completed. The total length of the line is about 14 m., and construction was begun in August, 1904.

NIPPON RAILWAY, JAPAN.—The Nippon Railway has been compelled to withdraw 100 freight cars from the coast line, on which 250 cars had been hitherto used for the transportation of coal. Of the remaining 150 cars, 135 are to engage in transporting coal to orders under special contract, so that only 15 cars remain for carrying coal for the use of the general public.

PROPOSED JAPANESE RAILWAY TO KIRIN.—Japan having obtained, as part of the terms of peace, the privilege of a railway between Kirin and Chanchun, it is pointed out at Tokyo that the distance between these points is about 90 m., and that the districts on either side are fertile. Gold dust and various metals, soda and coal are also found in considerable quantities.

TIENTSIN-CHIKIANG RAILWAY.—A Peking dispatch to a Shanghai native paper says that China has referred to the British minister at Peking a memorial regarding the cancellation of the Tientsin-Chikiang Railway Concession. The latter has informed China that the concessionaries are both British and German, and that should the German minister agree to its cancellation, he would have no objection.

RAILWAY IN FUKIEN, CHINA.—The capital of the proposed railway between Foochow and Amoy, extending about 600 Chinese li, will be Tls.8,000,000. The scheme is that the capital shall be supplied by the Chinese. Though there are several French capitalists in Foochow who are trying to get the concession, the metropolitan officials who are natives of Fukien have been able to get their scheme carried out without foreign assistance.

DEVELOPMENT OF WHAMPOA, CHINA.—For the purpose of making Whampoa a business center and constructing railroads thereto. His Excellency Chang Yat Shi, Minister of the Board of Commerce, who was formerly a prominent merchant in the Straits Settlements and had amassed an immense fortune, has gone to the Straits with a view to raising funds to carry out the scheme. It is reported that $5,000,000 will be required for the development of the place.

RAILWAYS IN KOREA.—Railways are springing up all over Korea. The latest scheme comes from the Province of North Chulla where the arrangements for constructing a line between Kunsan and Chonju are said to be progressing satisfactorily. A joint company with a capital stock of -Y-300,000 is to be formed, and the work of construction will begin as soon as official permission has been granted. The embryo company announces in advance that it expects to pay a dividend at the rate of 20 per cent.

CHINA AND THE MANCHURIAN RAILWAY.—H. E Na Tung, Chu Hung chi, and Hsu Shih-chang have memorialized the Throne to the effect that they consider the Chinese Eastern Railway to be the backbone of the three eastern provinces of Manchuria. They, therefore, consider it necessary that the railway should be restored entirely to China, and they quote, as an instance of the way it should be done, the example of the Chihli public loan raised by Viceroy Yuan Shih-kai. They suggest, therefore, the flotation of another domestic loan for this purpose. The Peking Government has ordered them to give a more detailed report on the matter.

ELECTRIC LIGHTING, TRACTION, POWER, ETC.

YOTSUYA-TO-AOIMACHI ELECTRIC LINE, JAPAN.—This section on the Tokyo Electric Railway has been opened to traffic.

AMALGAMATION OF ELECTRIC LIGHT INTERESTS, JAPAN.—The Hokkaido Electric Light Company has amalgamated its interests with those of the Sapporo Electric Light Company.

ELECTRICALLY DEVELOPED WATERPOWER.—The total waterpower used at the present time for the production of electricity is about 2,000,000 hp. Japan has 3,450 hp. and India 7,050.

SIAM ELECTRIC COMPANY, BANGKOK.—This corporation has purchased a 500-kw, 550-volt, direct-current, 2-stage Curtis steam turbine alternator, several direct-current pump motors and a switchboard.

TELEPHONE EXTENSION IN KOREA.—A telephone will soon be established between Masanpho, Taiku, Gensan, and Chinnanpho, and between Mokpho, Kunsan, Kangkyong, Kaisong, and Phyongyang during the next year.

J. G. WHITE & CO., LTD.—This branch of the engineering and contracting firm of New York, London and Manila, is busy just at present with new electric traction work for the London County Council, involving $800,000 gold.

ELECTRIC RAILWAY COMPANY, MOJI.—Nine prominent Japanese capitalists have applied to the Tokyo Government for permission to organize an electric railway company at Moji with a capital of -Y-700,000, with the object of transporting passengers and goods between Moji and Kokura.

WIRELESS TELEGRAPHY, CHINA.—The Chinese Government is reported to be arranging with a foreign engineer to put up wireless telegraphy at Wuchang, Shanghai, Nanking, Peking, and Tientsin. There are a number of native students studying the system at Peking and also at Tientsin.

OSAKA ELECTRIC LIGHT COMPANY, JAPAN.—This company is building a branch at Sasebo and intends to supply the town with about 6,000 lights. At Osaka and Sakai the number of lights supplied by the company is rapidly increasing, the growth in one month recently amounting to 1,500.

CIRCUM OUTER-MOAT TRAMWAY, TOKYO.—The Yotsuya-Akasaka section of the circum-outer-moat tramway (Tokyo Electric Railway) has been opened to traffic. the circle being now completed with the exception of a short distance between Toranomon and Aoizaka, for which the company issues transfer tickets.

LIGHTING PLANT FOR FORT WILLIAM MCKINLEY, MANILA, P. I.—The Secretary of War at Washington has approved the expenditure of $48,000 for the erection of an electric lighting plant for Fort William McKinley. Plans and estimates are soon to be given to contractors by the chief engineer officer of the Philippines Division so they can bid on the work.

COOPER HEWITT LAMP IN JAPAN.—An exhibit was recently given of the Cooper-Hewitt lamp to the Japanese Emperor. The occasion was the graduation exercises of the Tokyo Imperial University. The Emperor attended the ceremony as an exceptional case, as he very seldom goes out of his palace. The head professor of electrical engineering, Professor H Nakano, a post-graduate of Cornell University, class of '89, had the honor of explaining the workings of the lamp before the Emperor, which was supplied by the Japanese Engineering and Contracting firm of Messrs. Takata & Co., who are agents for the Westinghouse Electric and Manufacturing Company in Japan.

AMERICAN ELECTRICAL SALES, JAPAN.—The General Electric Company has received orders from Messrs. Mitsui & Co, Tokyo. Japan, for one 3-phase, revolving-field, 200-kw, 60-cycle, 2,300-volt generator and one 110-volt, 7-kw direct-current marine generating set with switchboard. Another order for the Kosaka Copper Mines, Japan, consists of one motor-generator comprising a 100-hp. 3,120-volt induction motor, direct connected to a 75-kw, 550-volt, direct-current generator. In addition to the above, a recent order includes 28 m. of single-conductor, lead-covered wires of various sizes, and 22 m. of stranded lead-covered cables of various sizes. Messrs. Grant & Co., Ltd., are Manila agents of the General Electric.

PACIFIC CARRYING TRADE.—Mr. S. T. E Gibbon, one of the vice-presidents and general counsel of the San Pedro, Los Angeles, and Salt Lake Railroad Company, has sailed for the Orient from San Francisco to consummate arrangements, it is believed in American railway circles, for a steamship line from San Pedro in Southern California to China and Japan. It is further reported that the proposed steamship line will be controlled entirely by United States Senator W. A Clark, of Montana, and be operated in connection with the Clark railroad system, and entirely independent of any similar line which Messrs. Harriman or Huntington may have in mind.

CABLES TO JAPAN.—The Formosa cable route to Japan has been working slowly of late. In normal times there are four such routes to Japan. Two of them, from Vladivostok to Nagasaki and from the southern extremity of Korea to Japan, have been closed in consequence of the war. A direct cable from Shanghai to Nagasaki has been carrying nearly all the messages since the beginning of hostilities, and there is also a roundabout route *via* Formosa and the Liu Kiu Islands from Foochow, China, to Ohama, Japan. The Shanghai-Nagasaki cable was recently interrupted by typhoons, and for a time dispatches were received for transmission by steamer from Shanghai to Japan, 500 m. away

STEEL SCREW STEAMER *Clarehill*.—The steel screw steamer *Clarehill*, built by Messrs. Craig, Taylor & Co., Ltd., Stockton-on-Tees, to the order of Messrs. E. Haslehust & Co., London, has been given a successful trial trip at sea. The vessel is of the following dimensions:—369 ft. by 49 ft by 28 ft. 9 in. moulded. She is built of steel to the highest class in Lloyd's under special survey. The engines have been constructed by the North-Eastern Marine Engineering Company, Ltd., Sunderland, having cylinders 26, 42 and 72 in. in diameter, by 48 in. stroke, with three large steel boilers working at 180 lbs. pressure. Over a course of 6 m. a speed of 12½ knots was maintained. The vessel has loaded for the Fart East under charter by the Nippon Yusen Kaisha.

PORT WORKS, DREDGING, DOCKS, ETC.

THE DINDINGS, STRAITS SETTLEMENTS.—The cost of survey of the Dindings is estimated at $40,000 of which $10,000 will be expended next year.

RECLAMATION AT CANTON.—There is a movement on foot in Canton, China, which has for its object the raising of funds for reclamation works. It is estimated that from Chin-Loong-How to the Loong-Mo Temple, 10,000 *tseng* (Chinese acres) of land could be reclaimed and another 10,000 *tseng* from the Loong Mo Temple to Wongsha. The total amount of money which this scheme is expected to realize is $2,000,000.

KIANGNAN DOCK, SHANGHAI.—The new Kiangnan dock is making rapid headway and should be finished and ready for business about the date this issue of THE FAR EASTERN REVIEW goes to press. New machine shops, etc., are also being erected, and when completed the new work will be able to undertake any class of shipping construction. The new dock will have a length on top of 365 ft., on blocks 325 ft., and a width on sill of 19 ft.

NEW DOCK, HONGKONG.—A contract for three patent slipways to be laid down at Hongkong has been placed with Messrs. S. and H. Morton & Co., of Leith. One of these slipways is to be capable of taking up vessels 400 ft. long by 40 ft. beam and of 2,700 tons weight. The other two are for vessels 290 ft. in length by 50 ft. beam and weighing 2,000 tons. All are to be driven by electric power. The patent slipways are designed for the new dock which Messrs. Butterfield & Swire are building at Quarry Bay.

SHIPBUILDING, MARINE, ETC.

JAPAN'S NAVAL CONSTRUCTION.—The firm of Krupp, at Essen, has received from the Japanese Government an order for a supply of sheet iron and guns for the Japanese fleet. The value of the order is said to be very large.

STEAMSHIP SERVICE EXTENSION, JAPAN.—The Nippon Yusen Kaisha will soon open a new steamship service between Japan, Singapore, and Java. The manager of the Hongkong branch of the company is now visiting the ports mentioned to make the necessary arrangements.

LAUNCH OF STEAMER HUICHOW.—Scott's Shipbuilding and Engineering Company, Greenock, have launched the steamer *Huichow*, the first of a fleet of six ordered from them by the China Navigation Company, London. The dimensions of the vessel are:—Length 267 ft., breadth 40 ft., depth 22 ft. 6 in., and carrying capacity 2,600 tons. The machinery will be supplied by the builders.

NEW NORDDEUTSCHE BRANCH LINE IN ORIENT.—This new branch steamship line will be known as the Austral-Japan Line. The point of departure will be Sydney, and outwards the ports of call will be Herbertshohe, Matupi, Simpsonhafen, Friedrich-Wilhelmshafen, Hongkong, Yokohama and Kobe, which will be the terminus. Homeward from Kobe, Moji, Hongkong, and Friedrich Wilhelmshafen will be called at.

NEW STEAMSHIP LINE, JAPAN.—A new steamship company, called the Dshler-Line, has opened business in Japan and intend to have a regular service between Japan, Korea, and Shanghai. The steamers are all new vessels and are named *Ohio I*, *Ohio II*, *Ohio III*, and *Ohio IV*. They will carry the Japanese mail and are scheduled to make regular trips. The vessels are excellently fitted up for first, second, and third class passengers, with electric lighting and steam heating throughout.

TO REFLOAT *Stanley Dollar*.—The Yamashima Kaiji Kogyo-jo, Japan, has undertaken the refloating of the American steamer *Stanley Dollar* which was lately driven on the rocks off Katsuura, Chiba, but the work will not commence until differences of views between the underwriters of the hull and those of the cargo have been settled. The wreck of *Stanley Dollar* was sold at public auction and realized-Y-27,250. The cargo of barley was sold for-Y-14,025.

WATERWORKS AND IRRIGATION

HANKOW (CHINA) WATERWORKS.—Viceroy Chang Chih-tung has raised Tls. 7,000,000 from the Hongkong and Shanghai Banking Corporation, and Tls. 3,000,000 have already been paid, besides which the viceroy has received Tls. 1,000,000 with the object of establishing waterworks for Hankow. The construction of this plant has often been attempted but failed, owing to the difficulty of raising funds. A British contractor is attempting to get the contract for constructing the waterworks.

WATER SUPPLY, PENANG, STRAITS SETTLEMENTS.—The Municipal Engineer of Penang, Mr. L. M. Bell, reported recently on the proposed additional water supply there for Batu Ferringgi and other streams at the N. end of Penang Island. The report deals practically with three districts—Tanjong Bungah, Batu Ferringgi, and Telok Bahang. After giving comprehensive details concerning various streams and sources of supply, the Engineer shows that the Sungei Klean, in the Tanjong Bungah District is the cheapest and most expedient source of tiding over the present difficulty. The present supply may be put down at 4,500,000 galls. daily. According to one estimate from Sungei Klean an additional supply of 1,000,000 galls per day, costing 6 cents per 1,000 galls., may be obtained, the capital cost being $330,000. It would be possible to lead the supply from Sungei Klean into the Waterfalls. This is the cheapest recommendation. On the other hand, if the municipality wishes to provide for the future, too, it may take up the Batu Ferringgi scheme, giving an addition of $2,983,000 galls., costing 11 cents, the capital cost being $1,853,000. Between these schemes there are two modifications.

MINES AND MINING

COAL MINES OF BUZEN AND CHIKUZEN.—The recent typhoon caused damage to the coal mines at these places to the estimated extent of -Y-2,330,000.

KECHAU GOLD FIELDS, PAHANG, F. M. S.—The company which has been promoting this enterprise has temporarily stopped all work owing to the principal lode on the concession giving out. The manager, Mr. E. A. Watson, has left his post at Lipis.

CHINA'S COAL DEPOSITS.—China's resources for coal and iron are among the largest and most favorably situated in the world. The extent of the great coal-fields has been put at 400,000 sq. m.—more than 70 times the aggregate extent of all the coalfields of Britain. It is expected that very soon Chinese coal will be delivered at Far Eastern ports at prices with which no other coal can possibly compete, and that China, in consequence of this development, will become a large exporter of iron.

YUNNAN (CHINA) TIN INDUSTRY.—The viceroy of Yunnan is trying to raise funds for the formation of a company to work the tin deposits at Tungchiu. The tin industry is the means of living for the people of Yunnan, and the principal article of export, the taxes on which are a large source of revenue. Owing to the capital being small and the works being destroyed during the trouble, it can not recover its original state. It is desired to combine officials and merchants and raise money for the formation of a company to work the tin. The shares will be 1,000 dragon dollars each. Chinese capital only will be accepted.

FUSHUN (MANCHURIA) COAL FIELDS.—According to reports from the experts sent by the Japanese Government to Fushun, the coal deposits there must be regarded as among the richest in the world. The depth of the coal layers is stated to be nearly 66 ft. and the total quantity of coal is estimated at least at 800,000,000 tons. Estimating the value at -Y-10 per ton, the value of the mine is fixed at -Y-3,000,000,000. The quality of the coal is very good and is said to be superior to that from the Kiushu mines. The government intends to make use of the coal at the Edamitsu Iron Works. It is not yet settled whether the government or private enterprise will develop the Fushun mine.

GOLD AND SILVER PRODUCT, JAPAN AND FORMOSA.—According to investigations made by the Financial Department of the Tokyo Government, the quantity of gold and silver produced in Tokyo and four other mining districts of Japan, and in Formosa up to the end of last June, was as follows:—

Mining Districts.	Gold. *Momme.*	Silver. *Momme.*
Tokyo	70,861	1,452,710
Sendai	72,179	6,331,983
Osaka	50,770	2,547,993
Pukuoka	245,232	508,095
Sapporo	22,470	739,572
Formosa	324,707	———

The estimated output of gold and silver throughout the country this year is 1,338,288 and 20,004,703 *momme* respectively—an increase of 158 *kwamme* in gold and of 1,972 *kwamme* in silver compared with the actual output of 1904.

BUILDINGS.

GERMAN ELECTRIC COMPANY, TIENTSIN.—The building for the new German Electric Light Company is nearing completion. It has been erected in a central position, between Deutsche and Rohrschied streets, facing the square. The German Concession is the last to be served with electric light.

RAILWAY STATIONS, JAPAN.—The Nippon and Kobu railway companies are building their own stations at Shinjuku, to take the place of the present one, which is now used by both companies. The Tokyo Street Railway Company has also commenced the extension of its station and car depot at Shinjuku.

ENGINEERING SOCIETY OF SIAM, BANGKOK.—Plans have been prepared for the erection of a building by this organization for its permanent home. They provide for a lecture hall and two rooms for other organizations with a separate entrance on the ground floor, and also a refreshment room, store, lavatory, etc. The first floor will be devoted entirely to the Engineering society, and provides a reading verandah, reading room, library, secretary's room and council room, and a spare room. It is estimated that the building erected on a suitable site will cost in all Tcs. 60,000. The members of the Home Committee, which is promoting the scheme, are Messrs. Th. Collmann, E. Sandreczki, and E. Bock.

WARING-WHITE COMPANY.—The Waring-White Company, of which Mr. J. G. White, head of Messrs. J. G. White & Co., contractors and engineers of New York, London and Manila, is one of the principals, is the contractor for the gigantic Hotel Ritz, which is being erected in Piccadily, overlooking Green Park, London. This building is expected to be one of the wonders of the European hotel world. It will cost upwards of $5,000 000 gold. The steel superstructure alone will cost almost $1,000 000. The company is also constructing the big offices of the International Mercantile Marine Company, of Trafalgar Square, which building is one of the most conspicuous of London. It is now nearly finished. Other London contracts include a large hotel to be called the Waldorf, built and equipped mainly on the lines of the Waldorf-Astoria of New York. Contracts have also been undertaken for the construction of two large apartment houses, one to be named Harley House, to be in the NW. residential district, while the other building is to be adjacent to the French Embassy, facing Hyde Park. The Waring-White people have also secured the contract for the new Liverpool Cotton Exchange. These buildings will be the first to be erected in England on the American method of self-supporting steel frame construction.

IMPROVEMENTS IN THE PHILIPPINES.

LUNETA RECLAMATION SCHEME, MANILA.—Work has been begun by the Atlantic, Gulf and Pacific Company on the seawall which will be necessary for the consummation of this improvement, and the company is under contract to finish the entire reclamation scheme with all possible despatch. It is believed that the extension will be finished by October, 1906.

FORT WILLIAM MCKINLEY.—Construction work still progresses at Fort William McKinley, near Manila, and there is much more in prospect. Plans and specifications for a military prison, a veterinary hospital and a crematory are now being prepared under the direction of Captain Horton, constructing quartermaster, and contracts on these buildings will be let in the near future. The prison will cost $80,000, the hospital $5,000, and the crematory $7,000.

NEW HOTEL, MANILA.—Advertisements for the proposed hotel on the Luneta extension, to be constructed under government patronage, will be published about January 1st. The basis of the advertisement will be the offer by the government of a piece of land 600 ft. square in the reclaimed tract facing Malecon Drive on the E., the new Luneta on the S. and Manila Bay on the W. The person who agrees to spend the most money in the construction of the hotel will be awarded the land.

PUBLIC WORKS, MORO PROVINCE.—Captain F. R. McCoy, provincial engineer of the Moro Province, sends some interesting engineering news to THE FAR EASTERN REVIEW through the Bureau of Engineering of the insular government. The general construction work of the province is under the supervision of Mr. C. F. Vance, C. E., assistant provincial engineer. *Provincial Building*.—The new provincial building, illustrations of which were recently published in this paper, will contain all the provincial, district and municipal offices in Zamboanga. It will be of concrete to the second floor, and the cement plaster will be laid on expanded metal. Plumbing supplies, the installation of electric wiring, the water system and the enamelled tile roofing have not yet been supplied. *Dock Work*.—The contract for building a new wharf at Jolo, Island of Jolo, has been awarded to the Atlantic, Gulf and Pacific Company, of Manila. This work is a pile structure 180 ft. by 36 ft. Molave piles will be used. All braces will be of Molave. The superstructure will be guijo, a native hardwood. *Dock Extension, Zamboanga*.—Proposals will be requested in the near future for the extension of dock at Zamboanga. *Bridge Work, Zamboanga*.—Two steel girder bridges are being erected on Calle Magay, Zamboanga. The structural material is being furnished by the Atlantic, Gulf and Pacific Company. Abutments and bridges are being erected by native labor under the direction of the provincial engineer. *Road Work*.—The construction of public highways in the Moro Province is under the supervision of Mr. A. D. Ritchey, C. E., junior assistant engineer. *Roads under Construction*.—Jolo-Asturias, Jolo; Davao-Santa Cruz, District of Davao; Iligan-Lake Lanao, District of Lanao; Zamboanga-Mercedes and Zamboanga-Santa Maria, District of Zamboanga. Native labor is being used exclusively on road work, superintended by American foremen. The provincial engineer says that Moros, under proper supervision, are excellent laborers and form the majority of *camineros* and permanent maintenance gang.

MISCELLANEOUS NOTES.

AMERICAN ENTERPRISE, KOREA.—It is announced that an American syndicate, in connection with the development of Korea and Manchuria, is raising a capital of $2,500,000 gold on the New York market.

MANUFACTURING FOREIGN GOODS, KIRIN.—The assistant Tartar general at Kirin intends to establish an industrial department for the manufacture of foreign goods, with a capital of Tls. 300,000 in 3,000 shares of Tls. 100 each. Foreigners will not be allowed to take up shares.

MESSRS. KELLY & WALSH, LTD.—This Hongkong firm of booksellers, stationers, etc., which, for the last 27 yrs. has been doing business under the shadow of the Hongkong Hotel, in Queen's-rd, recently removed to York Building, Chater-rd, where it occupies ideal premises for its business.

AUSTRALIAN COAL IN JAPAN.—A Yokohama firm, in cooperation with Japanese dealers, intend to import Australian coal, according to the *Japan-Times*. The price for delivery at Yokohama will be about Y-12 per ton. At present Kiushiu coal is quoted at -Y-12 and Y-13, and as quotations are rising it is believed not difficult to import Australian coal at a profit.

OPENING UP MANCHURIA.—The Chinese Government has completed the investigation of the question of opening up Manchuria to foreign trade and decides that in addition to the towns opened for foreign trade in accordance with the stipulations of the Chino-Japanese and American-Chinese treaties, *viz*. Mukden, Antung, Tatung-Kou, the towns of Kirin, Ninguta, Hunchun, Hulangting and Tsitsihar will be opened for this trade.

COTTON CULTIVATION, KOREA.—According to an official Japanese report, the principal districts where cotton is at present produced in Korea are the Provinces of Pyeng An, Chol La, Chung Cheng, Kyeng Sang, Kueng Keui, and Whang Hai. The soil of these districts consists for the most part of disintegrated granite sand and friable earth, well suited for the cultivation of cotton; but the farming methods of the Koreans are primitive and insufficient, and the area of cotton under cultivation might, with improved methods and the use of proper manures, be greatly extended.

TRADE OF THE PHILIPPINES.—The excess in the value of exports over imports, exclusive of currency, for the fiscal year ended June 30th, 1905, was ₱3,000,000. It is believed that this will almost be doubled during the current fiscal year, as the value of exports, exclusive of currency, for the first 9 mos. of the calendar year 1905, show an increase of ₱12,635,664 over that for the corresponding period of 1904. The total export for that period in 1904 amounted in value to ₱39,386,339 while for the same 9 mos. of 1905 they amounted in value to ₱52,022,000. During that time the principal exports were hemp.

AMERICAN MACHINERY IN JAPAN.—During the years 1903 and 1904 the Westhinghouse Machine Company, of East Pittsburg, Pa., have sold in Japan no less than 56 Westinghouse engines, ranging from 600 h. p. down to 12½ h. p., and aggregating in capacity almost 8,000 h. p. They are all of the vertical single-acting type, both simple and compound. The list of consumers comprises government arsenals, railroads, electric light companies, bureaus, waterworks, mines, universities and hospitals. Among the more important orders filled are the following:—Akabane arsenal, 1950 h. p.; Kure and Tokyo arsenals, 1628 h. p.; Kiushiu and Nippon railways, 579 h. p.; Yokoska arsenal, 747 h. p.; Fukagawa and Tokyo electric light companies, 450 h. p.; Mr. Furukawa's western bureau, 1265 h. p.; Tokyo Imperial University, 93 h. p.; Yokohama Electric Wire Works, 62 h. p.; Tokyo waterworks, 31 h. p.

CHINESE BOYCOTT, FRENCH INDO-CHINA.—The Chinese merchants of Cholon, Saigon, wanted to boycott American goods following the example set them in China. In Tonquin the Chinese already commenced the boycott, and those of Cochin-China were going to join them in the campaign when M. Stang, chief of the firm of Denis Frères, at Saigon, who is also acting American consul, addressed the Government of Cochin-China on that subject, pointing out the harm which such a movement would do. For instance Cochin-China depends upon America for its supply of wheat and kerosene. The stock of the latter product on hand was 120,000 cases, and there were three more shipments to arrive in Saigon with 60,000 cases. The Chinese merchants at Cholon held their first meeting; the second meeting was set for a subsequent date, but the police stepped in and broke up the meeting. This stopped the boycott movement at Saigon.

TRADE OF STRAITS SETTLEMENTS.—The total value of imports of merchandise during the second quarter of the current year was $83,085,670, as compared with $82,493,512 during the corresponding period of 1904. Coin and bullion imported fell off in the 3 mos. from $14,008,452 to $3,010,233. From the different settlements in the colony the figures for imports stand as follows;—Singapore, increase from $60,616,402 to $61,004,018; Penang, increase from $21,039,260 to $21,131,497; Malacca, increase from $837,850 to $950,155. Total increase, from $82,493,512 to $83,085,670. The total value of exports from the whole colony was $70,436,471 as compared with $63 082 797 for the corresponding period of 1904. Exports of coin and bullion decreased from $15,706,464 to $4,382,587. For the different settlements the export figures were as follows:—Singapore, increase from $48,928,494 to $50,062,407; Penang, increase from $13,302,641 to $19,531,994; Malacca, decrease from $851,662 to $842,070. Total increase, from $63,082,797 to

(Continued on p. XVII, advertising section.)

FAR EASTERN STOCKS AND QUOTATIONS

COURTESY OF BENJAMIN, KELLY & POTTS, SHAREBROKERS, HONGKONG, October, 1905.

STOCKS	WHEN ESTABLISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation* PER CENT	CLOSING QUOTATIONS
Banks.												
Hongkong and Shanghai Banking Corporation	1865	$10,000,000	80,000	$125	$125	*g* £1,000,000 *s* $8,500,000 *i* $250,000	$1,702,728	30-6-05	£1.15/- at exchange 1/10½= $18.66.67 for first half year 1905	21-8-05	5	$900 sellers London £91
National Bank of China, Limited	1891	£699,475	99,925	£7	£5	$200,000	$41,768	31-12-04	$2 (London 3/6) for 1903	1-2-04	—	$38 buyers
Marine Insurances.												
Canton Insurance Office, Limited	1881	$2,500,000	10,000	$250	$50	$1,400,000 *j* $81,739	$150,494	31-12-03	$17 for 1903	22-10-04	5	$337½ buyers
China Traders' Insurance Co., Ld.	1865	$2,000,000	24,000	$83.33	$25	$950,000 *f* $151,992 *j* $362,366 *u* $371,445	Nil.	30-4-04	$4½ for year ended 30-4-1904	8-12-04	5¼	$79 sales
North China Insurance Co., Ld.	1863	£150,000	10,000	£15	£5	Tls. 800,000	Tls. 217,119	30-6-04	Interim of 7/6 for 1905	1-5-05	8	Tls. 82 buyers
Union Insurance Society of Canton, Limited	1867	$2,500,000	10,000	$250	$100	*s* $1,850,000 *g* £20,000 *f* $372,749 *j* $893,100 *u* $846,773	$2,078,997	30-6-04	$35 for 1903	21-1-04	4½	$780 buyers
Yangtsze Insurance Association, Ld.	1862	$800,000	8,000	$100	$60	$750,000 *i* $50,000 *j* $5,890	$599,364	31-12-04	$12 and $3 special dividend for 1903	12-4-05	8½	$172½
Fire Insurances.												
China Fire Insurance Co., Ld.	1870	$2,000,000	20,000	$100	$20	$1,000,000 *x* $218,039 *f* $2,241	$260,374	31-12-04	$6 dividend and $1 bonus for 1903	10-3-05	8	$87½ buyers
Hongkong Fire Insurance Co., Ld.	1868	$2,000,000	8,000	$250	$50	$1,200,505	$360,372	31-12-04	$34 for 1903	7-3-05	10	$340 sellers
Shipping.												
China and Manila Steamship Co., Ld.	1882	$750,000	(*l*) 30,000	$25	$25	$5,000	$8,832	31-12-04	$1 for 1904	27-3-05	5½	$18 sellers
Douglas Steamship Co., Ld.	1883	$1,000,000	20,000	$50	$50	$261,638 *i* $88,941	Nil.	30-6-05	$3½ for year ended 30-6-1905	25-9-05	10¾	$32 ex div.
Hongkong, Canton and Macao Steamboat Company, Ld.	1865	$1,200,000	80,000	$15	$15	*e* $250,000 *d i* $600,000 *f* $145,376	$8,064	30-6-05	$1 for first half-year 1905	16-8-05	7½	$26¾ buyers
Indo-China Steam Navigation Company, Ld.	1882	£1,200,000	(*2*) 60,000	£10	£10	£120,000 *i* £241,150 *h* £3,999	£4,435	31-12-04	12/- @ 1/10 7-8=$6.29.51 for 1904	13-7-05	6½	$95
Shanghai Tug and Lighter Co., Ld. Do. Preference.	1903	Tls. 1,500,000	200,000 100,000	Tls. 50	Tls. 50	*i* Tls. 25,000	Tls. 43,762	31-12-04	Interim of Tls. 2. for 1905 Interim of Tls. 1¾ for 1905	28-8-05	7¾ 8	Tls. 59 sales Tls. 47 sales
"Shell" Transport & Trading Co., Ld.	1898	£2,000,000	2,000,000	£1	£1	£400,000 *i* £4,116	£58,852	31-12-03	Interim of 1/- (Coupon No. 5) for '04	1-1-05	4¾	21/- sales
"Star" Ferry Co., Ld.	1898 1900	$200,000	10,000 10,000	$10 $10	$10 $5	$65,000 *i* $24,257	$929	30-4-05	$1.80 $0.90 cents for year ended 30-4-05	29-5-05	5½ 3¾	$33 sellers $25 sellers
Straits Steamship Co., Ld.	1890	$500,000	(*3*) 5,000	$100	$100	$400,000 *e* $21,075 *i* $130,153	$21,231	31-12-04	$10 for 1904	21-3-05	7	$142½
Taku Tug & Lighter Co., Ld.	—	T.T 1,500,000	30,000	T. Tls. 50	T. Tls. 50	Tls. 98,000 *d* Tls. 195,479 *e* Tls. 28,000 *i* Tls. 81,200	Tls. 4,333	31-12-04	Interim of Tls. 2 for 1905	27-7-05	13¾	Tls. 29
Refineries												
China Sugar Refining Company, Ld.	1878	$2,000,000	20,000	$100	$100	*e* $450,000 *r* $150,000	$42,812	31-12-04	Interim of $10 for 1905	18-8-05	10½	$230
Luzon Sugar Refining Company, Ld.	1882	$700,000	7,000	$100	$100	none	*Dr.* $85,987	31-12-04	$3 for 1897	24-3-98	—	$15½ buyers
Perak Sugar Cultivation Co., Ld.	—	Tls. 350,000	7,000	Tls. 50	Tls. 50	Tls. 100,000	Tls. 1,635	30-9-04	Tls. 2½ for year ending 30-9-1904	17-12-04	3¾	Tls. 68 sales
Mining.												
Chinese Engineering & Mining Co., Ld.	1901	£1,000,000	1,000,000	£1	£1	*d* £40,000 *h* £12,289	£7,820	29-2-04	Interim of 1/- (No. 4)	1-7-05	—	Tls. 9 buyers
Oriental Consolidated Mining Co., Ld.	1901	G. $5,000,000	*y* 500,000	G. $10	G. $10	none	G. $672,093	31-12-04	Interim of 50 cts. (gold) for '95 (No. 5)	11-7-05	—	G. $17
Raub Australian Gold Mining Co., Ld.	1892	£200,000	150,000 50,000	£1 £1	18/10 £1	£4,873	*Dr.* £8,745	31-3-05	No. 12 of 1/-=48 cents	28-1-01	—	$4

STOCKS	WHEN ESTAB-LISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation* PER CENT	CLOSING QUOTATIONS
Docks, Wharves and Godowns.												
Farnham (S. C.), Boyd & Co., Ld	1901	T5,520,000	55,200	T100	T100	T1,000,000	T34,924	30-4-05	Final of T8 making T13 for 1904/05	24-6-05	9½%	T144 sales
Fenwick (Geo.), & Company, Ld	1889 1905	$450,000	6,000 *z* 12,000	$25	$25	$70,000	$8,577	31-12-04	$3¼ for 1904.. on 6,000 shares... First year	13-3-05 —	7½% —	$27 $25
Hongkong and Kowloon Wharf and Godown Co., Ld.	1886	$2,000,000	40,000	$50	$50	$250 000 *d.r.* $58,423 *i* $10,000 *p* $300,000	$29,422	31-12-04	Interim of $2½ for 1905	26-7-05	4¾%	$104
Hongkong & Whampoa Dock Co., Ld.	1901	$2,500,000	50,000	$50	$50	*i* $41,500	$501,332	30-6-05	$6 for first half year '05	22-8-05	7	$185 buyers
New Amoy Dock Co., Ld.	1892	$40,500	6,000	$6¾	$6¾	$55,500	$489	31-12-03	$1¼ for '03	5-5-04	7	$17 sellers
Shanghai and Hongkew Wharf Co. Lt.	1902	T3,200,000	32,000	T100	T100	*b* T487,210 *r* T59,880	T10,711	31-12-04	Interim of T6 for 1905	23-8-05	6½%	T187½ buyers
Yangtsze Wharf and Godown Co., Ld.	1902	T250,000	2,500	T100	T100	T17,500	T2,762	31-12-05	T18 for '04	29-3-05	9¼%	T192½ buyers
Lands, Hotels and Buildings.												
Astor House Hotel Co., Ld.	1901	$750,000	(4) 30,000	$25	$25	$14,156	$9,028	30-6-05	$2½ for year ending 30-6-05	19-8-05	9 %	$28 buyers
Astor House Hotel, Ld. (Tientsin)	—	T. T100,000	2,000	T. T50	T. T50	T34,000 *e* T8,000	T806	29-2-05	Final of T5 making T9 for the year.	20-4-05	6¾%	T135
Central Stores, Ld. Do. (Founders')	—	$91,845	6,000 123	$15 $15	$12 $12	$20,000	$1,502	31-12-04	Final of 60 cents making $1.80 for 04.. None	30-3-05 —	12 % —	$15 $100
Do. (New Issue)	1904	$360,000	24,000	$15	$7½				Preferential of 7% for '04	30-3-05	7½%	$7
Hongkong Hotel Co., Ld.	1866	$600,000	12,000	$50	$50	$648,975 *r* $31,087	$10,126	30-6-05	$5 for first half-year 1905	4-9-05	6¾%	$147 buyers
Hongkong Land Investment and Agency Co., Ld.	1889	$5,000,000	50,000	$100	$100	*e* $250,000	$37,875	31-12-04	Interim $3½ for 1905	27-7-05	5½%	$128 sellers
Hotel des Colonies Co., Ld. (Shanghai)	1902	T225,000	9,000	T25	T25	*n* T20,986	T7,202	31-3-05	T2½ for the year ending 31-3-05	18-5-05	14 %	T18 sales
Hotel Metropole Company, Limited	1904	$200,000	2,000	$100	$100	—	First	year	Interim of $4	26-1-05	...	$105 sellers
Humphreys' Estate & Finance Co., Ld.	1887	$1,500,000	150,000	$10	$10	*i* $200,994 *e* $50,000	$11,958	31-12-04	90 cents for '04	11-2-05	7¼%	$12½ buyers
Kowloon Land and Building Co., Ld.	1889	$300,000	6,000	$50	$30	none	$377	31-12-04	$3 for '04	31-1-05	7½%	$40 buyers
Shanghai Land Investment Co., Ld.	1901	T2,600,000	52,000	T50	T50	T828,813 *e* T170,000	T40,066	31-12-04	Interim of T3 for '05	21-7-05	6¾%	T122 sellers
Tientsin Hotel des Colonies, Ld.	1903	T70,000	1,400	T50	T50	none	T670	31-12-04	Interim of T3 for '05	4-7-05	12 %	T45
Tientsin Land Investment Co., Ld.	1902	T772,600	7,726	T100	T100	*i* T67,300	T725	31-12-04	Interim of T3 for '05	2-8-05	6 %	T117½ buyers
Wei-hai-wei Land and Building Co., Ld.	1899	T91,850	3,764	T25	T25	none	T687	31-12-04	None	—	—	T12
West Point Building Co., Ld.	1889	$625,000	12,500	$50	$50	none	$1,247	31-12-04	Interim of $1¾ for '05	27-7-05	6¾%	$55
Cotton Mills.												
Ewo Cotton Spinning and Weaving Co., Ld.	1895	T750,000	15,000	T50	T50	none	T12,844	31-10-04	T4 for year ended 31-10-03	22-12-03	8 %	T52½ sales
Hongkong Cotton Spinning, Weaving and Dyeing Co., Ld.	1901	$1,250,000	125,000	$10	$10	*e* $30,000	$23,264	31-7-05	$1 for year ended 31-7-05	4-9-05	7 %	$14½ sellers
International Cotton Manufacturing Co., Ld.	1895	T750,000	(5) 10,000	T75	T75	T50,000 *n* T31,669	T13,629	30-9-04	Interim of 3% a/c 1898	30-4-98	—	T44 buyers
Laou-kung-mow Cotton Spinning & Weaving Co., Ld.	1895	T800,000	(6) 8,000	T100	T100	none	T10,000	31-12-04	Interim of 4% a/c 1898 on 6,000 shares	1-8-98	—	T59 buyers
Soey Chee Cotton Spinning Co., Ld.	1895	T1,000,000	2,000	T500	T500	*l* T5,658	T22,051	31-12-04	4% for 1897	2-2-98	—	T260 buyers
Miscellaneous.												
Anglo German Brewing Co., Ltd.	1905	$100,000	4,000	$100	$100	—	—	—	First year	—	—	$105
Bell's Asbestos Eastern Agency, Ld.	1895	£5,377.10s	8,604	12/6	12/6	£314	£770	31-12-04	1/3 per share for '04	21-7-05	9¼%	$7 buyers
Campbell, Moore & Co., Ld.	1886	$12,000	1,200	$10	$10	$8,000	$1,182	31-12-04	$3 for 1904	1-4-05	8¼%	$36
China-Borneo Co., Ld.	1903	$720,000	(7) 60,000	$12	$12	none	—	31-12-04	$1 for 1904	17-3-05	8½%	$11¾
China Flour Mill Co., Ld.	—	T200,000	4,000	T50	T50	T30,000	T718	31-12-04	Interim of T5 for 1905	24-7-05	8½%	T77½ sellers
China Light and Power Co., Ld.	1901	$500,000	50,000	$10	$10	none	$3,739	29-2-04	None	—	—	$10
China Provident Loan and Mortgage Co., Ld.	1898	*a* $1,000,000	100,000	$10	$10	$80,000	$1,581	31-12-04	80 cents for 1904	18-1-05	9 %	$9 buyers
Dairy Farm Company, Ld.	1896	$187,500	25,000	$7½	$6	—	—	31-7-04	$1¼ for year ending 31-7-03	20-11-03	—	$17¼

STOCKS	WHEN ESTABLISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation* PER CENT	CLOSING QUOTATIONS
Miscellaneous.—Continued												
Green Island Cement Co., Ld.	1889	$1,500,000	150,000	$10	$10	p $400,000 $500,000	$95,054	31-12-04	$2 for 1904	27-2-05	7 %	$28
Hall & Holtz, Ld.	—	$420,000	(8) 21,000	$20	$20	$186,000	$7,551	29-2-05	Final of $1½ making $2½	15-4-05	9¼%	$27
Hongkong and China Gas Co., Ld.	1864	£70,000	7,000	£10	£10	f £25,394 £3,000	£8,188	31-12-04	Final of 6% & bonus of 1% making 22s. for 1904	25-5-05	7 %	$175 buyers
Hongkong Electric Co., Ld.	1889 1899	$600,000	30,000 30,000	$10 $10	$10 $5	none	$2,151	30-4-05	$1.00 50 cents for year ending 30-4-05	17-7-05	6¾% 5¼%	$15¼ buyers $9¼ buyers
Hongkong High-Level Tramways Co., Ld.	1887	$125,000	1,250	$100	$100	$50,000	$2,796	30-11-04	$15 for year ending 30-11-04	24-12-04	7 %	$215 buyers
Hongkong Ice Company, Ld.	1881	$125,000	5,000	$25	$25	k $60,000	$5,356	31-12-04	Interim of $4 for 1905	2-8-05	7 %	$237½ sellers
H'kong Rope Manufacturing Co., Ld.	1883	$500,000	10,000	$50	$50	$60,000	$11,137	31-12-04	$10 for 1904	10-4-05	7 %	$152 buyers
Hongkong Steam Waterboat Co., Ld.	1900	$150,000	15,000	$10	$10	$2,500	$299	30-9-04	Interim of 50 cents for half year ended 31-3-1905	3-6-05	13¾%	$14 sellers
Lane, Crawford & Co., Ld. (Shanghai).	1903	$250,000	2,500	$100	$100	none	$42,009	29-2-05	Final of $9 making $14 for 1904	19-4-05	9½%	$145 buyers
Maatschappij tot Mijn-, Bosch- en Landbouwexploitatie in Langkat	1902	G.2,500,000	25,000	G.100	G.100	T528,210 T19,465	T35,849	31-10-04	3rd quarterly dividend of T2½ making so far T15 for '05	15-9-05	—	T240 buyers
Mondon, (E. L.) Ld.	1902	T350,000	7,000	T50	T50	none	Dr. T117,638	31-12-04	T5 for 1902	2-5-03	—	T25
Philippine Company, Ld.	1904	$675,000	67,500	$10	$10	—	—	—	First year	—	—	$8 nominal
Shanghai and Hongkong Dyeing and Cleaning Co., Ld.	1903	$60,000	1,200	$50	$50	none	Dr. $5,537	31-8-04	None	—	—	$50
Shanghai Gas Co., Ld.	1903	T800,000	16,000	T50	T50	d T145,000 T108,172	T8,011	31-12-04	Interim of T3½ for 1905	26-7-05	7 %	T123½ sales
Shanghai Horse Bazaar Co., Ld.	1904	T270,000	5,400	T50	T50	T45,000	T9,751	31-12-04	T6 for 1904	17-3-05	7½%	T80 sellers
Shanghai Pulp and Paper Co., Ld.	—	T450,000	4,500	T100	T100	T25,000	T6,968	31-12-04	Interim of T6 for 1905	22-7-05	9 %	T150 sellers
Shanghai Sumatra Tobacco Co., Ld.	1902	T600,000	(9) 30,000	T20	T20	w T24,820 T25,000	T1,297	31-10-04	Final of T6 making T9	8-3-05	13½%	T68
Shanghai Waterworks Co., Ld.	1881	£144,000	7,200	£20	£20	T170,000	T17,220	31-12-04	Interim of 15/- for 1905	27-7-05	4½%	T44c buyers
South China Morning Post, Ld.	1903	$150,000	6,000	$25	$25	none	Dr. $5,068	29-2-05	None	—	—	$20
Steam Laundry Co., Ld.	1902	$75,000	15,000	$5	$5	none	$3,644	31-5-04	60 cents for year ended 31-5-04	2-8-04	7½%	$8
Straits Ice Company, Ld.	1884	$200,000	2,000	$100	$100	$25,000	$700	31-12-04	$5 account 1905	...-2-05	—	$150
Tientsin Waterworks Co., Ld.	1901	T. T200,000	2,000	T. T100	T. T100	e T15,259 T4,000	T1,012	30-4-05	Final of T4½ making T8½ for '04/5	17-6-05	7 %	T. T120
United Asbestos Oriental Agency, Ld. Do. do (Founders')	1896	$100,000	9,900 100	$10 $10	$4 $10	$22,000	$551	31-5-05	80 cents $19.80 for year ended 31-5-05	29-7-05	9 % 11 %	$9 buyers $180
Watson (A. S.) & Co, Ld.	1886	$900,000	90,000	$10	$10	$300,000 $25,000	$6,096	31-12-04	Final of 50 cents making $1 for '04	29-5-05	7 %	$14½ sales
William Powell, Ld.	1901	$150,000	15,000	$10	$10	e $4,500	$676	30-6-05	Final of 70 cents making $1.20 for year	2-10-05	10½%	$11½ ex div.

LOANS AND DEBENTURES	AGENTS FOR THE LOAN	AMOUNT OF LOAN	PAR VALUE	OUTSTAND'G BONDS	WHEN PAYABLE	CLOSING QUOTATIONS
China Government, 7 per cent. Silver Loan 1886 E.	Hongkong & Shanghai Bkg. Cor.	T767,200	T250	1969	Mar. 31st & Sept. 30th each year until Mar. 31st, 1917.	par. Plus accrued interest
Hongkong Hotel Co., Ltd., 6% Mortgage Debentures of 1899‡	Hongkong & Shanghai Bkg. Cor.	$500,000	$500	§ all	Half yearly, June 30th and December 31st	par.
Shanghai & Hongkew Wharf Company, Ltd. 6% Debentures of 1902	Hongkong & Shanghai Bkg. Cor.	T543,900	T100		Half yearly, June 30th and December 31st	T97
Astor House Hotel Co., Ltd. 8% Debentures of 1903	Hongkong & Shanghai Bkg. Cor.	T500,000	T100		Half yearly, January 1st and July 1st	T105
Chinese Engineering & Mining Co., Ltd., 6% Debentures of 1903†		£500,000	¶	£480,000	Half yearly, June 30th and December 31st	par.
International Cotton Manufacturing Co., Ltd. 6% Debentures of 1901	Russo Chin. B.	T500,000	T100		Half yearly, March 31st and September 30th	par.

a Authorized capital $2,000,000
b Building Reserve Account.
c Capital Reserve Fund.
d Depreciation Fund.
e Equalization of Dividend Fund.
f Exchange and Investment Fluctuation Account.
g Gold Reserve Fund
h Exchange Reserve Account.
i Insurance Fund.
j Reinsurance Fund.
k Contingencies Account

l Legal Reserve Fund.
m
n Sinking Fund.
o
p Premium on New Issue.
q
r Repairs and Renewals Account.
s Silver Reserve Fund.
t
u Underwriting Suspense Account.
v

w Special works Fund.
x Extra Reserve Fund.
y 75,000 owned by the Company.
z 6,000 shares unissued.
1 5,725 shares unissued.
2 First issue of 60,000 of which 10,411 unallotted.
3 785 shares unissued.
4 7,600 shares unissued.
5 1,616 shares unallotted.
6 842 shares unallotted.
7 14,000 shares unissued

8 399 shares unissued.
9 Only 13,000 shares issued.
* Based on last year's dividend.
§ 268 held by the Company.
¶ In certificates of £20 and £100
‡ Redeemable in 10 years, or at option of Company the Company giving 6 months' notice.
† Redeemable at par at rate of £10,000 per annum from 31st December, 1903, to 31st December, 1952
Dr. Deficit.

SINGAPORE SHARE QUOTATIONS.

Courtesy Messrs. Fraser & Co., Brokers, Singapore, November, 1905.

NAME	DATE OF FORMATION	CAPITAL	CAPITAL PAID UP	NO. OF SHARES	ISSUE VALUE	PAID UP	RESERVE	LAST DIVIDEND	SINCE LAST MAIL HIGHEST	SINCE LAST MAIL LOWEST	CLOSING QUOTATIONS
									$	$	$
Mining.											
Bersawah Gold Mining Co., Ld.	1900	$175,000	115,000	13,500 *1*	10	10					14.00 sellers
" " " " " *Deferred.*				4,000	10	10					8.00 sellers
Bruseh Hydraulic Tin Mining Co., Ld.	1901	$600,000	600,000	60,000	10	10			8 00	7.50	8.00 buyers
Kadana Gold Mining Co., Ld.	1901	$300,000	300,000	20,000	10	10					2.00 sellers
" " " " " *Pref.*				10,000	10	10					10 00 nominal
Kechau Goldfields, Ld. *Fully paid*	1902	£30,000	16,175.7/-	6,207	1	1					3 00 sellers
" " " *Contrib.*				23,793 *2*	1	19/-					2.00 sellers
Pahang Corporation Ld.	1889	£250,000	244,306	244,306	1	1	20,000	3 per cent for year ending 30 6-02	3.50	3.00	3.00 sellers
Pahang Kabang Ld.	1890	£375,000	375,000	360,000	1	1					0.75 sellers
" " " *Pref.*				15,000	1	1					...... nom.
Queensland Raub G. M. Co., Ld. *Fully paid*	1901	£146,700	100,866	36,700	1	1					...... nom.
" " " " *Contrib.*				110,000	1	11/8					0.30 sellers
Raub Aust. Gold Ming. Co., Ld. *Fully paid*	1892	£200,000	191,250	50,000	1	1	4,873	1s. paid January, '01			4.00 nom.
" " " " " *Contrib.*				150,000	1	18/10		1s. " " "			3.75 sellers
Redjang Lebong Mining Co.	1898	f.2,000,000	1,800,000	20,000 *3*	100	100		22 9-10% for year ending 31-12-04	385.00	375.00	385.00 buyers
Royal Johore Tin Mining Co., Ld.	1900	$220,000	220,000	22,000	10	10		5 " for year ending 15-2-04			3.25 sellers
Sipiau Tin Co., Ld.	1899	$230,000	230,000	23,000	10	10		5 " for ½ year ending 30 6-05			4.75 buyers
The Belat Tin Mining Co., Ld.	1903	$300,000	300,000	30,000	10	10			6.00	5 00	5.00 sales
Tronoh Mines, Ld.	1902	£160,000	149,185	160,000 *5*	1	1		5/6 paid during 1905			19.75 sellers
Duff Development Co., Ld.	1903	£400,000	350,000	400,000 *6*	1	1					8.50 sellers
Rubber.											
Bukit Rajah Rubber Co.	1903	£70,000	61,000	70,000 *13*	1						£3.10s. 0d.
Balgownie Rubber Estate Ld.	1905	$200,000	100,000	20,000	10	5					$7.00 sales
Cicely Rubber Estates Co.	1904	£12,000	10,500	6,000	1						£2.2s. 6d
" " " 5% Pref.				6,000 *14*	1						£1.15s. 0d.
Pataling Rubber Estate Syndicate	1903	£30,000	17,500	30,000 *15*	1	1					£4.10s. 0d.
Ribu Planting Co. Ld.	1904	$200,000	135,000	2,000 *16*	100	100					$200.00 buyers
Sandycroft Rubber Co.	1904	$100,000	85,000	1,000 *17*	100	100			200.00	180.00	200.00 sellers
Selangor Rubber Co. Ld.	1898	£30,000	26,000	30,000 *18*	1	1					£7.10s. 0d.
Sione Rubber Company, Ld.	1904	$100,000	88,000	1,000 *20*	10	10					$12.00
Singapore & Johore Rubber Co. Ld.	1903	$100,000	78,750	150	100	100					$100.00
" " " " " *Contrib.*				850	100	75					75.00
Sungei Way Rubber Co. *Fully paid*	1904	£50,000	13,920	6,920	1	1					£2.0s. 0d. sellers
" " " " *Contrib.*				35,000 *19*	1	4/-					£1.0s. 0d.
Vallambrosa Rubber Co.	1904	£60,000	50,000	60,000	1						£4.5s. 0d.
General.											
Fraser & Neave, Ld.	1898	$225,000	225,000	4,500	50	50	112,500	10 p. ct. and 2½ per cent bonus for '04	105.00	103.00	105.00 buyers
Hogan & Co., Ld.	1904	$480,200	334,800	3,348	100	100	5,000	7 per cent March 1905			50.00 buyers
H'kong and Shanghai Banking Corporation	1865	$10,000,000	10,000,000	80,000	125	125	10,000,000 *9* 8,500,000 250,000 *10*	35s. for ½ year ending 30-6-05			850.00
Howarth Erskine, Ld.	1901	$1,200,000	1,200,000	12,000	100	100	275,000	10% and 5% bon. for yr. end. 30-6-05	265.00	250.00	265.00 buyers
Maynard & Co., Ld.	1901	$34,000	34,000	3,400	10	10		20 per cent for year ending 31-10-04			23 00 sellers
Riley, Hargreaves & Co., Ld.	1899	$875,000	875,000	6,000	100	100	150,000	10 p. ct. and 2½ p. ct. bon. for year '04	200 00	195 00	200.00 buyers
" " " " 7% Pref.				2,750	100	100		7 p. ct. for year 1904			115.00 buyers
Singapore Cold Storage Co., Ld.	1903	$600,000	240,000	24,000 *4*	10	10					8.50 buyers
Singapore Dispensary Ld.	1891	$30,000	30,000	600	50	50	19,000	12½ per cent for year ending 31-7-04			77.50 buyers
Straits Ice Co., Ld.	1884	$200,000	200,000	2,000	100	100	22,000	5 " interim for 1905			150.00 buyers
Straits Steam Ship Co., Ld.	1890	$500,000	421,500	5,000 *7*	100	100	400,000 169,228 *11*	5 p. ct. interim for 1905			150.00 buyers
Straits Trading Co., Ld.	1887	$3,000,000	2,500,000	300,000 *8*	10	10	700,000 1,021,395 *12*	10 p. ct. & 50cts. bon. ½ yr. end. 31-3 05			42.50 sales
Tanjong Pagar Dock Co., Ld.	1864	$3,700,000	3,700,000	37,000	100	100	1,950,000	$20 for half year ending 31-12-04			500.00 sellers
Debentures. $											
Howarth Erskine Ld. 7 per cent ... 250,000											3 per cent prem.
Singapore Municipal 6 " ... 400,000											... nominal
" " 5 " ...1,878,000											3 " prem. buyers
" " 4 " ... 602,300											2 " dis. nominal
Riley, Hargreaves & Co., Ld. 6 p. cent 225,000											3 " prem. buyers
Tanjong Pagar Dock Co., Ld. 6 " 250,000											2 " prem. nom.
" " " " 5 " 1,365,500											prem. sales

1 3,500 unissued.
2 13,300 "
3 2,000 "
4 36,000 "
5 10,815 unissued.
6 50,000 "
7 785 "
8 50,000 "
9 Special Gold Reserve Fund.
10 Insurance Fund.
11 Sundry Reserves.
12 Sundry Reserves.
13 9,000 unissued.
14 1,500 "
15 12,500 " Mortgage £5,000
16 650 "
17 150 unissued.
18 4,000 "
19 8,080 "
20 1,200 "

THE FAR EASTERN REVIEW

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VOL. II. MANILA, P. I., AND SHANGHAI, DECEMBER, 1905. No. 7.

CONSTRUCTION, EQUIPMENT, AND TESTS OF THE FLOATING DRYDOCK "DEWEY"

For the purpose of providing docking facilities in the Philippine Islands, which should be capable of caring for any ship of the American Navy either now in these waters or to reach them in future, the United States Government, according to a copyrighted article in the October number of *Marine Engineering*, under an act of congress approved July 1st, 1902, called for proposals to be received by the Bureau of Yards and Docks in the Navy Department, and opened March 14th, 1903. Under these proposals that of the Maryland Steel Company, of Sparrow's Point, Maryland, having been found to be the most satisfactory in every way, was adopted, and contract accordingly entered into with the company April 20th, 1903, for the construction and equipment of the dock. The contract was the more readily awarded to the Maryland Steel Company because of the fact that it had previously had a very successful experience in this line of work in the construction of the large dock owned by the American Government and now in operation at Algiers, La., opposite the city of New Orleans. The specifications issued by the Government contained the following general requirements:

CONTRACT REQUIREMENTS.—The dock in general shall be an open-hearth steel structure, so designed and arranged as to be readily self-docking without the aid of divers or of auxiliary constructions. It shall be self-contained as to operating machinery, and capable of being towed safely from place to place without auxiliary bracing. It shall be of the general type, composed of watertight side walls, and body or pontoons with a general U-shaped cross section, and divided into a sufficient number of watertight compartments to give great stability, there being not less than 6 transversely.

The dock shall be not less than 500 ft. long over all outside of bracket platforms. It shall have a clear width between fenders of not less than 100 ft. The decks of the side walls shall have not less than 8 ft. of clear height above the water with 30 ft. draft over 4 ft. keel blocks. The dock shall have a lifting capacity of not less than 16,000 gross tons uniformly distributed over its entire length, with the main deck not less than 2 ft. above the water, and with not less than 1 ft. of water in the compartments. It shall be designed to take all classes of vessels of the United States Navy, either centrally or with the central line of the keel 1 ft. off the center line of the dock. It shall be so designed that the entire weight of a battleship may be safely carried by the main keel blocks, or one-half the weight on each side of docking keel blocks, and the side walls shall be designed to take shoring at any point which may be necessary.

No portion of the dock or its connections shall have a stress of more than 10,000 lbs. per sq. in. in self-docking, with a wind pressure of 30 lbs. per sq. ft. of exposed surface. The working deck of the dock shall be flush-plated and so strengthened that the docking keel blocks may be placed in any position, and the dock shall be so designed that the specified unit stress shall not be exceeded when the dock is pumped uniformly from all compartments to a freeboard of 2 ft. Under this latter condition the longitudinal and lateral deflection over the entire working deck of the dock shall not exceed 1 in 2,000. Within the limits of allowed deflection the ship-load shall be assumed to be perfectly flexible.

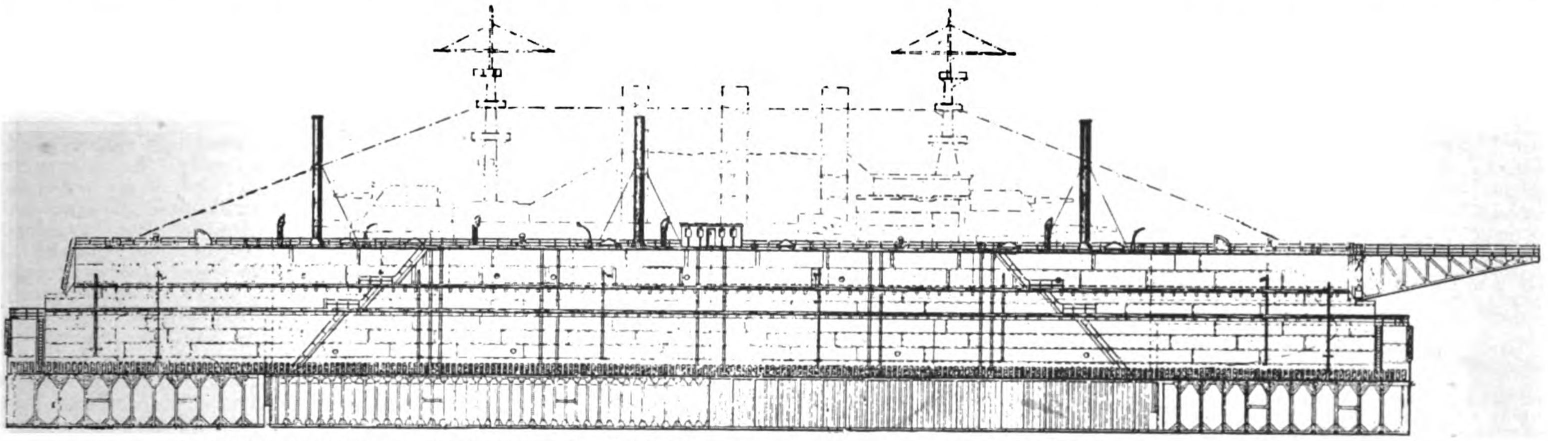
The decks of the side walls shall have a clear passage fore and aft of not less than 5 ft. in width, with a handrail on the outboard side, and passage shall be provided from one side wall to the other, as well as telephone or speaking-tube communication between the two side walls, along the walls, and with the engine room.

When self-docking, all under-water portions shall be raised to a clear height of not less than 5 ft. for ready accessibility for inspection, painting, and repairs. The dock shall be operated by steam power and fitted with all the necessary boilers, engines, pumps, feed-water heaters, steam separators, and other auxiliaries desirable to make a first-class self-contained plant. This plant shall be of not less than 600 h. p., with all boilers and engines suitably distributed to give the best results. A small machine shop, suitable for light repairs to the dock, shall be installed in one side wall. Storage shall be provided for fuel and fresh water sufficient for two complete successive dockings of the maximum load. Such portions of the side walls above the engine decks as are not occupied by machinery shall be fitted as store rooms, and as quarters for officers and crew, with suitable mess arrangements. An electric-light plant shall be installed, and a blower system for ventilation of all working and storage places and quarters.

The dock shall be designed to lift a load of 16,000 gross tons with a draft of 30 ft. clear of the water in a period of 4 hrs., the pumps being required to operate readily under a head of 35 ft.

The structural steel for the dock was required to have a maximum tensile strength of from 55,000 to 65,000 lbs. per sq. in., an elastic limit of not less than one-half the maximum tensile strength, and an elongation of not less than 23 per cent in 8 ins. It was required to bend cold 180 degs. around a bar of diameter equal to thickness of plate, and to bend at a red heat 180 degs. flat, all without rupture on outside of bent portion. Similar requirements were made for rivet steel but with tensile strength of only 47,000 to 55,000 lbs. per sq. in., and for steel castings whose strength should be upward of 60,000 lbs. per sq. in. The required tensile strength of wrought iron used was not less than 48,000 lbs. per sq. in., and all cast iron 18,000 lbs.

STRUCTURAL FEATURES OF THE DOCK.—The design as worked out from these specifications gives a dock of a total length of 500 ft., in 3 sections, of which the center has a length of 316 ft., and the end sections each 90 ft., with a 2-ft. open space between the center section and each of the others. The pontoons for the 3 sections are similar in transverse dimensions, the width being 134 ft. over all and the depth 18 ft. 6 ins. throughout. This width of 134 ft. is the extreme width over the side walls of the center section, whereas the end sections have a maximum width over side walls of 156 ft. with free space between them 139 ft. This allows for the center section being raised by the 2 end sections, and floated within their compass for any repairs or painting which might be found necessary, and this satisfies, so far as the center section is concerned,



INBOARD PROFILE OF FLOATING DOCK *DEWEY*, WITH A BATTLESHIP OF *GEORGIA* CLASS ON THE BLOCKS.

(Continued on page 170.)

THE FAR EASTERN REVIEW

GEO. BRONSON REA, M. E.

PUBLISHER AND EDITOR

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MANILA AND SHANGHAI, DECEMBER, 1905

THAT CANTON-HANKOW TREACHERY

In a recent issue *The South China Morning Post* pays a high compliment editorially to THE FAR EASTERN REVIEW for the frank manner in which it laid bare the perfidy of the Morgan clique in their manipulation of the Canton-Hankow Railway concession, which led to the final loss of this important enterprise to the Americans and practically destroyed our prestige in China, as well as our commercial integrity. While we sincerely thank *The South China Morning Post* for its generous estimate of our broadness of views in dealing with treacherous attempt to plunder the Chinese, with the help of the Belgians, we do not feel that honesty towards ourselves and justice to American interests in China could have permitted us to take any stand other than the one we did. And this is not all. In our editorial last month we simply skimmed over this development nostrum and gave only meagre details of the outrage. We are now prepared to write down more elaborate facts about the manipulation of the Canton-Hankow concession, which, while they may not be pleasant reading for those financial operators who attempted to play the two-handed game of "draw" against the Chinese and American interests in China, with the Belgians, give us a whole lot of satisfaction in telling. We are not inclined to blame the Belgians for the part they took in the deal, because the avowed policy of the Belgians in the Far East is imperialism. They just took advantage of another opportunity offered to extend their political and commercial influence over China. We believe the New York manipulators are wholly to blame.

With the transferring of the Canton-Hankow Railway, with all its valuable concessions, to the Chinese officials and British financial control, the last act has been rung down upon the operations of the American-China Development Company in China. To say that this act has weakened American prestige in the Far East would be putting it very mildly, and the agitation which preceded this step in a way was probably one of the causes of the present boycott against Americans and American products. This statement is made advisedly, because of the intense agitation upon the subject and the bitter feeling engendered towards the American concessionaries for their treachery in transferring the stock of the company to other foreigners when it was expressly forbidden in the concession. This agitation started early in 1904 by the very student classes who have urged on the boycott and the result of which was the final transfer of all franchises back to the Chinese. It will therefore be of interest to the public in general, particularly to the Americans, to know the true causes which led up to this loss to the United States in the Orient of the most important concession ever given to the Washington Government and the citizens of the homeland by any foreign government.

The preliminary concession was obtained April 14th, 1898, by A. W. Bash, who was in the employ of the late United States Senator Calvin S. Brice, of Ohio, the prime mover of the project, after many years of constant labor. The American-China Development Company was then organized with a capital stock of $600,000 gold divided into 6,000 shares of $100 each, to take up the concession. William Barclay Parsons was appointed chief engineer in 1898 and sent to China to make a preliminary survey of the main line between Hankow, Province of Hupeh, and Canton, Province of Kwangtung. This survey was finished early in 1899 and the report published in November of the same year.

In the meantime Senator Brice died, and his demise caused a great deal of discouragement among the stockholders of the American-China Development Company and most of them lost faith in the enterprise. The company was like a ship without a rudder, and it was at this time that the Belgians bought up many shares through the medium of the New York banking house of J. P. Morgan & Co. A reorganization took place, upon the completion of which it was found that 4,000 of the shares were in the hands of the Belgians. This fact, however, was not generally known at the time.

An American engineer-in-chief was then appointed, and he went to China early in 1902 to permanently locate and construct the line. Actual construction was begun in March, 1903, and was stopped in October, 1904. During this time 10 ms. of double track and 20 ms. of single track, practically 40 ms. of line, were completed and put in operation, and the grading and bridges built for 12 ms. more, and the rails laid over half the line. With the additional expenditure of $6,000 gold more these 12 ms. would have been put in operation.

The main agreement was executed April 14th, 1898, and a supplementary one July 13th, 1900. In the latter was a clause which prohibited the transfer to persons not Americans of any of the rights or privileges conveyed in the concession. Bonds were signed by authorized Chinese officials to the amount of $40,000,000 gold and placed in the hands of a trust company in New Jersey to be given to the American-China Development Company as it might need to sell them for construction purposes, and bonds to the value of $6,000,000 gold were released to them in 1903. In the meantime the company borrowed $3,000,000 gold with which to begin the construction of the road. Two million dollars of this loan were taken in Brussels and $1,000,000 in New York, it is useless to state by whom.

After the issuance of the bonds the Belgian loan was changed to a hypothecation of a number of them equal to the loan while the New York loan remained unchanged, and the other $4,000,000 in bonds were left with the trust company waiting for a stronger market.

Early in 1904 the Belgian stockholders became very much disgruntled with the American management of the company and demanded the resignation of the president and the engineer-in-chief. When this was accomplished they elected the same banker—name not necessary for identification—president who was their agent in purchasing the controlling interest from the American shareholders, and although no engineer-in-chief was appointed a Belgian engineer was sent out to China to control operations; also a Belgian chief accountant was put in charge of accounts. The Belgians apparently believed the time had come when it was no longer necessary for them to remain in the background, and in these various actions exposed the true condition of affairs.

The Chinese were quick to take advantage of the situation and directed the trust company to withhold the bonds, and, in October, the money available for construction work being exhausted, and no bonds available, work came to a stop. This was the beginning of the end, which culminated in the cancelling of the contracts by the Chinese and the payment of $6,750,000 gold to the American-China Development Company, as purchase price of their property and indemnity for cancelling the concessions, which gives the company a net profit of $3,000,000 gold.

As we stated editorially last month, the Chinese obtained this money as a loan from the Hongkong Government, giving as security for the loan the revenues of 3 provinces. Upon the payment of the money, the constructed portion of the line and the survey notes, together with all the rights and privileges held by the company, were transferred to the Chinese.

Here the first trouble developed among the Chinese and quarrels arose who was to take things over, no less than 15 officials appearing on the scene; not all, however, expecting to take charge. Chang Chi Tung, viceroy of the Provinces of Hupeh and Honan, who was the chief instigator of all the agitation to take the concession away from the American company and exploit it with Chinese capital, is at the head of the enterprise as it now stands. However, he is quite busy in trying to explain how it happened that he borrowed English money to pay off the Americans and Belgians. In the meantime British interests hold financial control, and indications are that they will continue so to do.

Another complication has arisen with the Belgians and French who have just completed the Lu Han or Hankow-Peking Railway. When the concession for the Canton-Hankow line was granted, a clause was inserted which gave the Hankow-Peking line to the American company in case the Belgians did not build it. This became known to the Belgians and they insisted that a similar clause be inserted in their concessions, *to wit*:—That if the American company did not build the Canton-Hankow line the concession should be transferred to the syndicate that was building the Hankow-Peking line. This clause was inserted and received the imperial sanction. As it fortunately happens for this company a large amount of French capital is in it, and after Chang Chi Tung's *coup de main* the matter was taken up by the French and Belgian ministers at Peking in the form of strong and vigorous protests, and they insist that the clause giving them the line be carried out. And now the viceroy of the "Two Hu's" will be quite busy explaining why he got his government into this mess. If he should be degraded he would not be the first

Chinese official who has lost his official head over these concessions. His Excellency Sheng Kung Pao, until recently director-general of all the Chinese railways, has been not only degraded but an estoppel has been put upon his entire property amounting to millions of taels.

But all these latest complications are another story. They are interesting as showing with what greed foreigners are clutching for railway concessions in China, only clinching our contention that the Morgan clique did American interests irreparable injury in the Far East—particularly in China—when it stooped to scoop in Belgian gold.

TIMBER INDUSTRY OF THE PHILIPPINES

During a most interesting and instructive conversation we had with Captain George P. Ahern, U. S. Army, chief of the Bureau of Forestry of the Philippines, that official expressed regret that the timbermen of the homeland are not giving more serious study to the possibilities which the investment of capital in the development of the forestry of the archipelago would insure. This lack of interest on the part of the timbermen seems to be the result of their almost total ignorance of concessions which have been made in the revision of the forestry laws of the Islands, rather than indifference of the wonderful wealth which the timberlands possess. The impression seems to prevail among the lumbermen of America that the forestry laws and regulations are impossible for large operations with modern machinery. While it may have been that hitherto there was sufficient ground for this conclusion, with the revision of the regulations the forestry situation has undergone a most satisfactory and encouraging modification in the interest of those who are masters of the industry. By way of explanation:—

The aims of the Bureau of Forestry are the conservation and renewal of public forests, and, in addition, the securing and distribution of knowledge concerning their extent, composition and economic wealth. In order to facilitate their management, they have been divided into 10 forest districts, and, so far as possible, each district is placed in charge of an experienced forester.

The forest area of the Philippine Islands has never been carefully surveyed, but has been estimated to contain about 40,000,000 acres. At the present time these areas are being mapped, with the view of facilitating exploitation. Nearly all forest areas have their native names and are naturally bounded by rivers or mountain ridges, and to these areas the cuttings of licensees are assigned.

The class of timber licenses which are most numerous average in quantity granted from 15,000 to 20,000 cub. ft. and mature in 1 yr. Laws recently enacted enable larger concerns to obtain greater concessions, both in area to work over and in volume. Such concessions usually mature in 20 yrs. The forester in charge of his district, in addition to the duties of administering cuttings, makes studies of unexplored areas, so that the bureau is now in position to give information concerning any part of the Islands, and will assist the unacquainted in securing information desired, when of a forestal nature. It will be well or imperative that the prospective lumbermen gain an idea of conditions prior to entering the field, as considerable difference is experienced between these forests and those of the United States and in their exploitation. As is well known, the minor or secondary products of forests in general—and this is especially true of tropical regions—form a very important item. Force available has prevented the bureau from making but a start in investigations which will develop this branch, but much is expected and the field is extremely promising. Among others, we find numerous species of *bejucos* (rattan) suitable for almost every calling where this plant has been used, and it is in abundance everywhere; also gums, resins, etc.

A review of past lumbering in the Philippines shows it to have been crude and extremely wasteful, owing to lack of good methods and means of exploitation. Cutting was localized to the extreme and resulted in clearings and extensive cogan lands, which are apparent today. At the present the bureau is experiencing a renaissance or transition from past crude methods to future up-to-date appliances. Even now most small operators are using primitive implements, and hauling is done by means of carabaos, but those who have introduced logging tools continue their use, and natives are quick in learning to operate them.

Of the numerous species composing the forests of the Philippine Islands, about 1000 are known and in the course of a year about 400 find their way to the Manila market. Many hard woods exist which are not cut, as felling and transportation means are not at hand. One licensee during the past year introduced saws for felling and working up, and utilized many hard species which were heretofore left. He expressed satisfaction with the work done and has proved the effectiveness of the saws in the hands of the natives. Various soft woods, which abound in the forests, are now consumed in match factories—an industry which is developing here very rapidly—and in making soles of shoes.

Trees of the same species vary considerably, according to the locality where grown. They differ in color, weight, and durability. The per cent of soundness in general is good, and very few species tend to be affected at maturity. When so affected, it is usually due to parasites such as *balete*, which is common to certain sections.

The development of lumbering is hampered by lack of up-to-date timbering apparatus and available means of transportation. We have ample supply and a fair market, which can be extended. These opposing features will be partly overcome, it seems certain, by the establishment of the proposed railway system which will offer outlets to forests heretofore untouched, and consume large quantities of timber in its construction. Transportation is now effected by means of rafts from points not further than 80 ms. from Manila, and by steamers and sailing vessels to more distant points. Timbers are usually hauled to the shipping point by carabaos, which are hired at ₱ 0.80 to ₱1 per day. The price of timbers on the beach depends largely on the distance to be hauled overland. In connection with this point, we find that *apitong* at Subic, near Manila, brings on the beach ₱0.12 per cub. ft., while at Moron, some 20 ms. S., it is to be had at ₱0.07 to ₱0.08. *Apitong* is floated by means of a light species—*lauan*. Rafting seems to be the more profitable, and in this connection it might be well to explain that the activity of lumbering by smaller cutters depends largely on agricultural seasons, as during the rice-planting season labor is tranferred to the rice fields. The price paid is usually ₱0.50 to ₱0.80 per day.

Various of the more promising timbers are being tested at the government's timber-testing laboratory, and several of the less known species are showing ramarkably well. Concerning various timbers and their fitness for special uses, it would be impossible here to give a detailed account. We may say, however, that time has shown certain of them to be resistant to various elements, such as duration in fresh or salt water when used as piles; others as ties or posts in the ground, and to the *anay* or fungus attacks in the air. Of brilliant furniture timber there is an abundance, of many colors and grain.

The cost of sawing in Manila is from ₱0.40 to ₱2.50 per cub. ft., varying according to the different degrees of hardness. In general, woods are sawed more easily when fresh, as certain species contain a resinous deposit which hardens with seasoning. Rates of transportation of timber on sailing vessels from Unisan, Province of Tayabas (148 ms.), are ₱0.24 to ₱0.30 per cub. ft., and from Masbate, Island of Masbate (285 ms.), ₱0.40 per cub. ft.

During 1904, 600,000 paving blocks—Australian blue gum—were purchased by the City of Manila and laid down here at ₱0.80 per M. *Molave dungon* and *ipil*, believed by the forestry experts to be superior, were offered at 3 times this price. All of which shows that it is due to lack of cheap and efficient means of transportation, exploitation and equipment for working up the material that the industry lies dormant. Several cable systems for logging have been installed and are giving very satisfactory results, but what is needed most to give lumbering an impetus, now that the laws are liberal, are capital and machinery.

PHILIPPINE RUBBER INDUSTRY

Because rubber culture may become an important industry in American tropical possessions, it is announced that the government at Washington will send Professor Olsson-Seffer to the Philippines very soon to examine and report on the advantages these Islands offer for rubber production.

To prepare himself for doing his work thoroughly, the professor has been studying rubber culture as it has been carried on in Mexico. His headquarters there was at La Zacualpa, widely known as the oldest and perhaps the best of American rubber plantations. It is certainly successful in proving that rubber growing in plantations is profitable under good management, and the theory is advanced that if good results have been secured there from rubber planting, equally good may be obtained in the Philippines.

In this connection it is interesting to note the great strides the Island of Ceylon is taking in rubber growing. During the past season Ceylon shipped 100,000 lbs. of rubber, all produced from the island plantations. The shipment was in the form of bisquits of chemically pure rubber which brought in the market a better price than the finest Para rubber.

The growing of rubber has been going on for some time in Ceylon, merely as an experiment, until within the last 4 yrs. Since then 60,000 acres have been planted in the island, and an equal amount in the Straits Settlements, at the rate of 250 trees to the acre. The planting has been done in a systematic and scientific way, so that trees reach sufficient maturity to begin producing in 3 yrs., in exceptional cases, and in all cases in 6 yrs. It is estimated that during the present season 100,000 acres will be added to the rubber plantations of Ceylon, and a similar area to those of the Straits Settlements, giving these colonies a total of 320,000 acres, which, at 250 trees to the acre, represents no fewer than 80,000,000 rubber trees under cultivation. This surpasses anything heretofore attempted anywhere else in the world, for the 80,000,000 rubber trees of the Congo District include wild trees as well as those under cultivation. It is estimated that in 3 yrs., at the present rate, allowing for no extension of the rubber-cultivated area, Ceylon and the Straits Settlements will be in a position to supply with the finest rubber at present known in the world the immediate demands for rubber of any kind.

It is generally admitted that rubber can not be successfully grown at a greater altitude than 1500 ft. above sea-level, yet so keen is the boom at the present moment in the Island of Ceylon that planters and estate owners are setting rubber seeds all over their land, quite irrespective of its suitability. Some of the plantations reckoned in the figures given above are at no less altitude than nearly 5000 ft. It is probable, however, that they never will yield a satisfactory rubber in remunerative quantities.

The profits of rubber-growing are enormous, and from $200 to $300 per acre is by no means an extravagant figure to reckon as the average in well-chosen localities, while $1000 an acre for yearling trees have already been paid. In addition to the actual rubber product there is a large profit to be made from the sale of the seed at the present time, although this is only a temporary condition.

Investigation pursued to the present time by the Bureau of Forestry of the Philippine Islands shows that there are large areas of wild rubber trees growing in certain sections of these Islands. The quality of the rubber has been carefully tested and found to be superior. All that is required to place the industry on a firm and big-paying basis are money and cultivation. The commercial demand for rubber in the United States alone is great enough to warrant the prompt and energetic development of this industry.

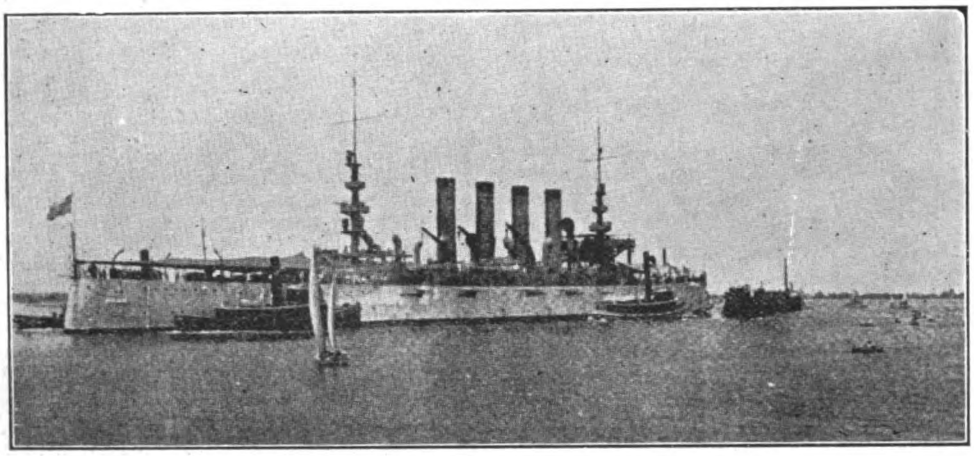
CONSTRUCTION, EQUIPMENT, AND TESTS OF THE FLOATING DRYDOCK "DEWEY"

(Concluded from page 167.)

the requirements for self-docking. The end sections are docked by the center section by being turned through a horizontal angle of 90 degs., and then floated in with their length of 90 ft. between the side walls of the center section, which has a free space between fenders of 100 ft. and a total space between walls of 106 ft. The length of the center section is seen to be sufficient to take in both end sections at once, with a clearance of 4 ft. between them. The total height of the dock structure is 63 ft. 8 ins., of which 42 ft. 2 ins. represent the height of the side walls above the main deck. The end pontoons are considerably lower than this, having a height above the dock of only 20 ft., which gives a total height for these sections of 38 ft. 6 ins.

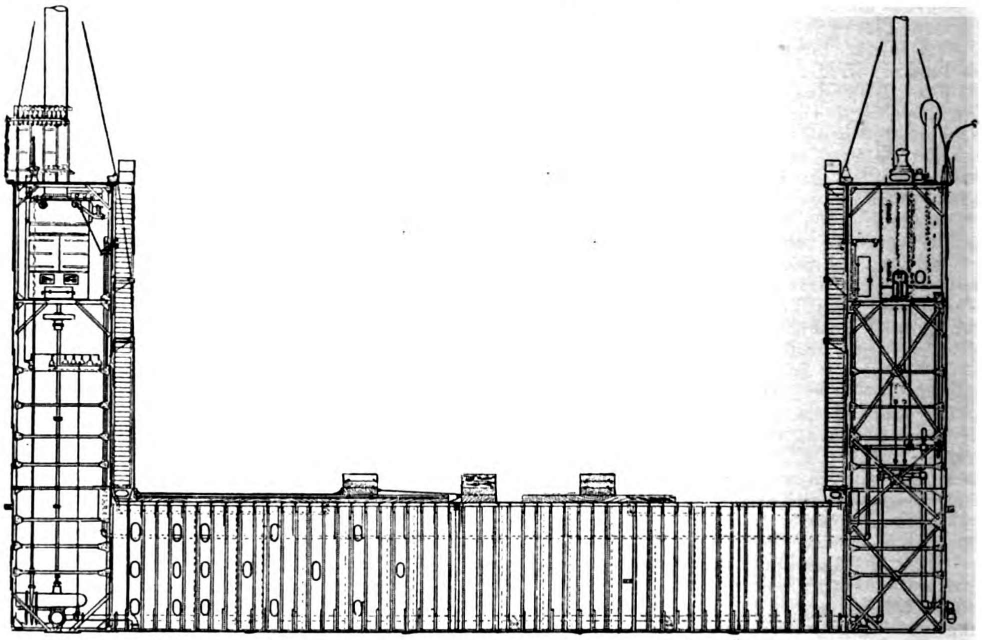
As required by the specifications, the dock is divided throughout its length into 6 watertight compartments by 5 longitudinal bulkheads, of which 1 is located in the center, 1 on each side of the center and at a distance of 22 ft. from it, and 1 immediately under the inside wall of the side walls of the dock. By means of transverse bulkheads numbering 5 in the center portions and 2 in each of the other the entire dock is divided into 72 separate watertight compartments, of which 36 are in the central portion and 18 in each end section. In addition to the transverse watertight bulkheads are other transverse bulkheads subdividing the dock into cellular structure and spaced 8 ft. apart fore and aft. These are all fitted with large manholes and limber holes to facilitate the free passage of water within the watertight cellular subdivisions.

The frame spacing throughout the dock is 24 ins. center to center, the frames consistnig in 6-in. by $3\frac{1}{2}$-in. by $\frac{7}{16}$-in. angles for the vertical and bottom members of longitudinal girders, while the top members consist in each size of channel bars which measure from the central frames 15 ins. by 32 lbs. and for the side frames 12 ins. by 25 lbs. These members are all connected in the corners by the usual diagonal braces of $4\frac{1}{2}$-in. by 3-in. by $\frac{7}{16}$ in. angle bars as well as with plate gussets. In the side walls the frames are built in the same manner, but are rendered more stiff by the introduction at intervals of horizontal struts. The transverse bulkheads are 7/16 in. thick and are attached to both bottom plating and the deck by means of double angle bars and to the side walls by single angle bars. The central longitudinal bulkhead is of the same scantling as the transverse bulkhead and is fitted intercostally between them. The other longitudinal bulkheads are of the same scantling as the central and are stiffened by 7-in. by 15.75 lb. channels spaced about 2 ft. apart. All the plating throughout the dock is so fitted as to cross the frames at right angles. The bottom plating is, therefore, transverse between the side walls and longitudinal under them. Its thickness throughout is 24 lbs., except that under the side walls of the center pontoon, which is reduced to $22\frac{1}{2}$ lbs. The middle strakes of the side-wall plating are 20 lbs. thick, which is increased towards the bottom to $22\frac{1}{2}$ lbs. The upper 2 strakes in the center of the dock are doubled for the purpose of obtaining additional stiffness.



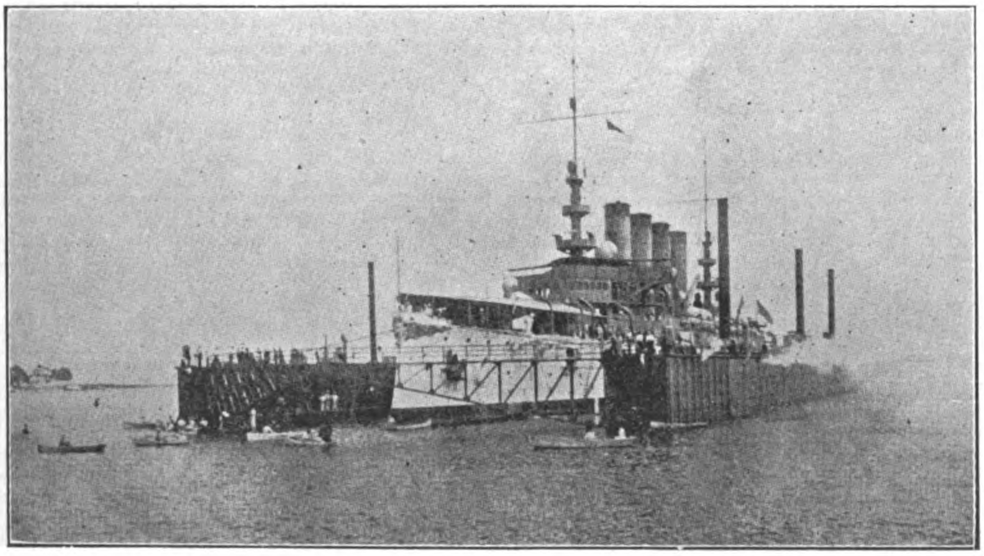
ARMORED CRUISER *COLORADO* ENTERING THE DOCK.

STEAM PLANT.—The steam plant required by the government specifications is actuated by steam generated in 3 Babcock & Wilcox boilers of the marine type, each boiler having a grate area of 46 sq. ft. with a heating surface of 1,750 sq. ft., thus giving a ratio of the latter to the former of 38 to 1. Steam is used mainly for the purpose of pumping, and for this there are 3 24-in. centrifugal pumps and 2 12-in. pumps of the same type. The latter are placed in the end pontoons and are used only for self docking, while the larger pumps are used for the regular purpose for which the dock is designed. Each of the latter is operated by a horizontal compound engine having cylinders $14\frac{1}{2}$ and 25 ins. in diameter respectively with a stroke of 14 ins. The cranks are at an angle of 135 degs. Each engine, with the regular steam pressure of 140 lbs. per sq. in., develops at a speed of 225 r. p. m. about 225 indicated h. p. The engines are placed far up in the wings and operate vertical shafts leading down to the pumps, which are very near the bottom of the side walls and which discharge outboard by means of horizontal pipes. The smaller pumps are each driven by simple engines with 12-in. cylinders and 10-in. stroke direct-connected to the pump shaft. The auxiliary machinery is operated by steam from a Babcock & Wilcox boiler with a grate surface of 18 sq. ft. and heating surface of 750 sq. ft., and consists in the main of a 7-kw. Sturtevant 110-volt generator driven by a simple direct-connected engine 6-in. by 6-in., and a distilling apparatus with a daily capacity of 2,500 galls.

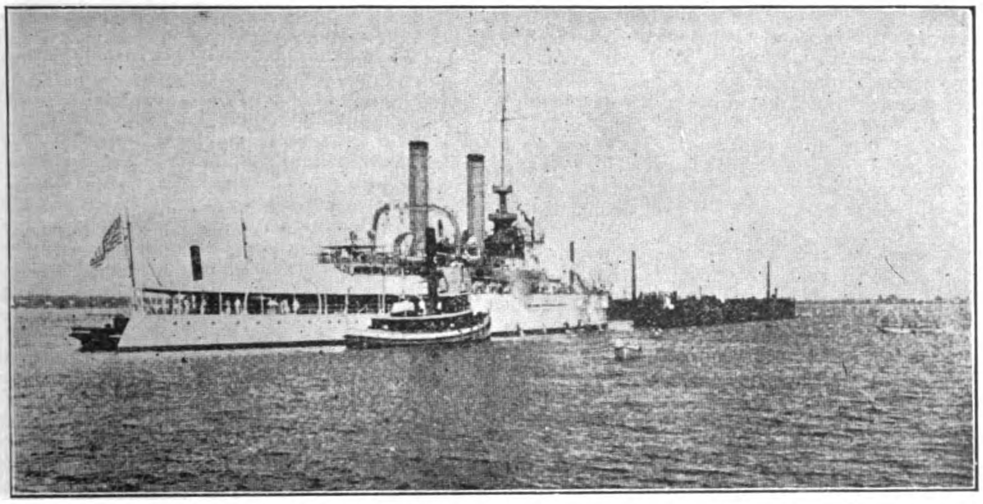


CROSS SECTION OF CENTRAL SECTION OF DOCK.

DESCRIPTION OF THE PUMPS.—The 5 pumps were furnished by the Morris Machine Works, of Baldwinsville, N. Y., and they are placed in the bottom of the dock, with their suction openings directly on top of the main suction

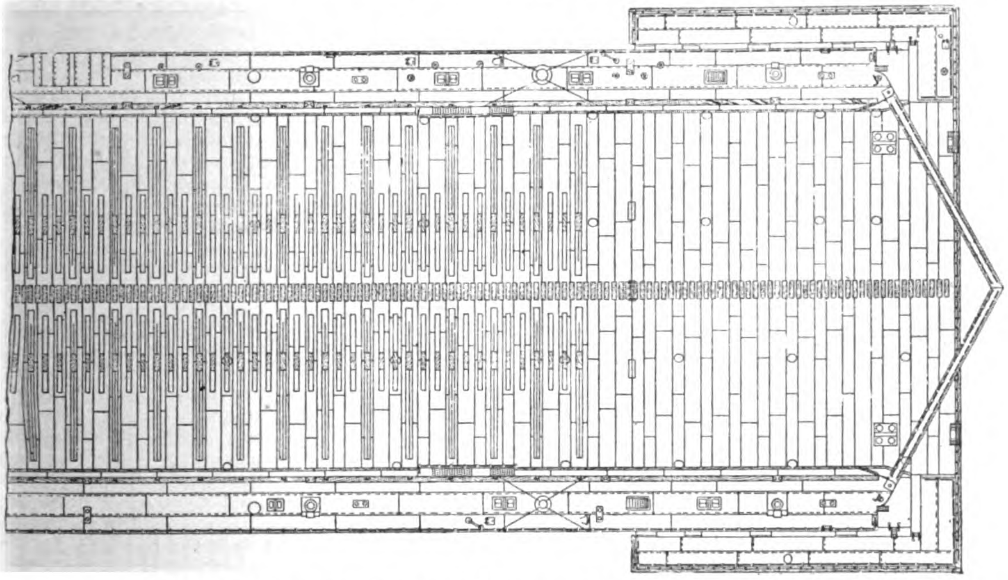


FLOATING DOCK *DEWEY* RAISING ARMORED CRUISER *COLORADO*.



BATTLESHIP *IOWA* ENTERING SUBMERGED DOCK.

pipe running the full length of the dock; while the driving engines are placed on an upper deck on the side wall of the dock, and are direct-connected to the pumps by a vertical shafting of 5-in. diameter. This is well shown in the illustration, which is one of the compound



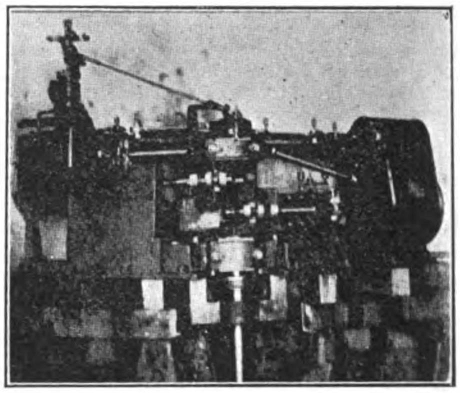
HALF-LENGTH PLAN OF DOCK, SHOWING HINGED FRONT BRIDGE.

engines operating a 24-in. pump. The crank shaft is 2-throw with the crank opposite, and the cylinders at an angle of 135 degs. The crank pins are 7½ ins. in diameter and 7 ins. long while the bearing section of the shalt has a diameter of 7 ins.

The 24-in. pumps are of solid-shell type, and are made of cast iron of very heavy proportions, each one fitted with a bronze runner of the shrouded type 54 ins. in diameter. As they are worked on vertical shafts it is important that the thrust bearing be relieved in operation of as much pressure as possible. They have, therefore, been designed so that the water exerts an upward pressure on the runner or impeller. The weight of the crank shaft line shafting and impeller is carried by a ball thrust bearing hung directly under the engine framing. This is composed of 2 rows of 1¼-in. steel balls.

The 12-in. pumps are of the same general construction and have impellers of a diameter of 40 ins. Both types are fitted with throttlong governors operated by gearing, so that in case the pumps should lose their priming the engines would be prevented from racing.

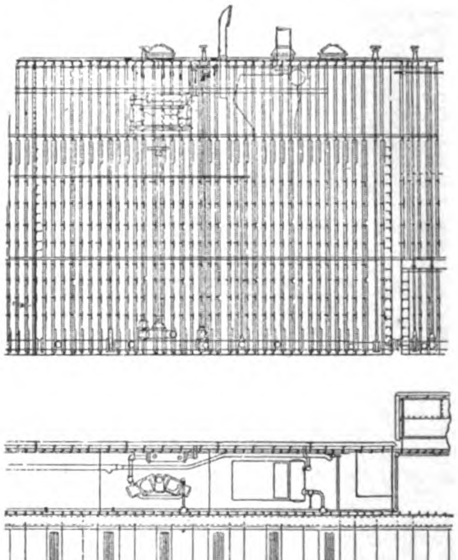
COMPARISON OF THE DOCK.—This dock is found by a comparison with other existing structures to be considerably the largest of any dock yet built. The requirements, according to government specifications, call for a capacity to lift 16,000 tons with a freeboard of 2 ft. As an actual fact, it is found possible with this freeboard to lift 18,500 gross tons; and a little calculation establishes the fact that



ONE OF THE PUMPING ENGINES.

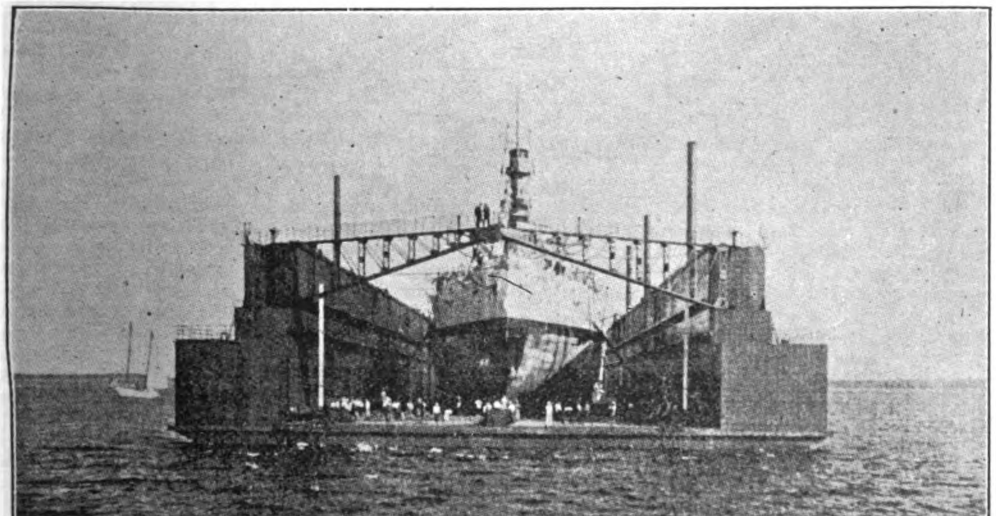
with a freeboard of 1 ft. the lifting capacity of the dock is 20,400 tons, and, with the main deck awash, the lifting capacity is 22,300 tons. The comparison with other docks shows that the 18,500-ton lifting capacity with a freeboard of 2 ft. is 1,000 tons greater than that of the Algiers dock built by the Maryland Steel Company, as before mentioned; and other large docks may be listed as follows:

The Bermuda dock, built in England and now a part of the equipment of the British Naval Station in the Bermuda Islands, has a lifting capacity of 16,500 tons; the Austrian dock at Pola is rated at 15,000 tons; the German



INBOARD PROFILE AND HALF PLAN, SHOWING PUMPING MACHINERY

dock at Stettin has a capacity of 11,000 tons; and the Pensacola dock, owned by the American Government, but which was formerly owned



END VIEW OF DOCK, WITH BATTLESHIP *IOWA* ON THE BLOCKS.

by Spain and was a part of the naval equipment at the port of Havana, Cuba, has a capacity of 10,000 tons.

COST OF DOCK AND ITS ACCOMMODATIONS.—*Dewey*, according to the original contract, was to have cost $1,124,000 gold, but certain modifications and additions crept in during construction, and the ultimate cost somewhat exceeds this figure. The steel used in construction amounts to about 11,000 tons, which is held in place by more than 2,000,000 rivets. This great weight, added to the lifting capacity of the deck, represents a total displacement of about 30,000 tons at a draft of 16 ft. 6. ins., but it is plain that for the dock to exercise its legitimate functions, a depth of water of above 50 ft. will be required in order that a ship drawing 30 ft. of water can float over the keel blocks while the dock is submerged. At light draft the dock draws only 6½ ft.

The accommodations on *Dewey* are designed for 9 officers and 12 men, with staterooms and mess hall, a well-appointed galley, and a finely-equipped library.

The dock was constructed under the immediate supervision of Mr. Leonard M. Cox, C. E., U. S. Navy, working in conjunction with Mr. S. Anderson, superintendent of the dock department of the Maryland Steel Company.

SUCCESSFUL OFFICIAL TESTS.—The first test of the finished dock was mabe by means of the armored cruiser *Colorado*, which had at the time a displacement of 13,300 tons distributed over a length of about 500 ft. The ship was lifted clear of the water in 2 hrs. 16 mins. A more severe test was that connected with the battleship *Iowa*, which had a displacement of 11,600 tons and a length on the keel blocks of about 330 ft. This ship was lifted clear of the water in 1 hr. 37 mins., but the pumping was continued until the dock had such a freeboard as to represent the raising of a 16,000-ton ship, which was accomplished in 2 hrs. 42 mins. altogether. In this latter case a deflection on the length of the dock was found amounting to 2 ins., which had increased at the expiration of 48 hrs. to 4 ins., but which in the bearing length of the ship did not exceed 1¾ ins.

The self-docking test occupied about 15 days, but it is expected that this time will ultimately be reduced to 8 or 10 days, which will be a record for this operation.

TRANSPORTATION TO THE PHILIPPINES.—The dock was turned over to the Navy Department about October 1st, and arrangements are now being made for towing it to Olongapo, its ultimate destination. Just how the tow will be made or what route will be adopted has not yet been decided upon at Washington, but the general impression is that it will be brought over in sections and probably through the Suez Canal. It is expected that the process of towing the dock this distance of about 13,000 miles will require about 5 mos.

MUNICIPAL IMPROVEMENTS, MANILA

In a communication to *Engineering News*, published in New York City, J. F. Case, M. Am. Soc. C. E., Chief Engineer, Department of Sewer and Waterworks Construction, Manila, P. I., discusses municipal improvements in progress and projected for this city. As supplementary to what has appeared in THE FAR EASTERN REVIEW of recent months, descriptive of projected works, what Mr. Case has to say on the subject should be of additional interest to engineers:——

The scheme of public improvements for the City of Manila comprises the expenditure of approximately $6,000,000 within the next 4 yrs., and opens a field of interest to contractors in general. The largest items are for the construction of a new sewer system and a gravity water supply, proposals for which will be received in January next.

The financial condition of the city is rare and worthy of comment. With a population of nearly a quarter million, and with an assessed valuation of nearly $45,000,000, the city has no indebtedness whatsoever, except that incurred by the sale of the first installment of the funds for the sewer and waterworks construction. The total issue authorized for this purpose is $4,000,000, of which amount $1,000,000 has already been sold to provide funds for beginning the work. A premium of 10% was realized on those bonds.

The adopted plans for sewers provide for a separate system, and no provision has yet been made for storm water drainage. The plans, in general outline, provide for starting the sewers at their upper ends, as near the surface as possible, and obtaining the necessary grade by increasing the depth thereof until the economical limit is reached. The sewage is then raised by pumping and the process repeated until the main station is reached, whence all sewage is finally disposed of by pumping seaward into the bay. The total estimated cost is about $2,000,000.

The plans for the water system provide for impounding the waters of the Mariquina River, a mountain stream, at a point some 16 ms. from Manila, and conveying the same by means of a steel riveted pipe and masonry conduit to the distributing reservoir in the environs of the city. The present distribution system will be utilized as far as possible, but large extensions will be necessary, though not at present under contract.

Aside from the sewer and water system there are at present under contract 3 bridges, aggregating in cost $125,000, and three sections of the Pasig River wall, aggregating $310,000.

In contemplation or preparation there is the improvement of the *esteros* or canals, whose ramifications extend throughout the city; the installation of a system of storm water drains; further construction of Pasig River walls, and a large amount of street construction and paving. The insular government will also receive bids early in the coming year for the construction of new steel wharves in the recently completed harbor.

Since the attention of contractors and material men may well be drawn to this field for enterprise, it is believed that a short description of conditions here may be of interest.

Climatically the year is divided into 2 seasons the dry, from December to May, and the wet, from June to November, both inclusive. During the dry months out-door work may be carried on without interruption, while the wet months will interfere more or less with work on low grounds, trenching, or control of streams. The average rainfall is about 75 ins *per annum*, of which amount about 80% falls during the wet months. Out-door work, however, is not by any means suspended during these months, since precipitation is not constant and many days without rainfall of importance are interspersed.

As regards health, Manila need not be feared. The death rate among Americans and Europeans, is low and, excluding infant mortality, the total death rate is not excessive. The most important question to intending employers is that of labor, and some diversity of opinion exists and is expressed. The views herein set forth are those of the writer, deduced from more than seven years' experience with the native laborer, not only in Manila but also in the provinces.

The native is of less robust physique than the American, and is consequently less efficient. He is also satisfied with earnings only sufficient for his immediate needs, and therefore after pay day does not care to work until his money is expended. Left to himself, he is prone to carelessness in his food and may easily be either underfed or poorly nourished. On the other hand, he is tractable, quiet, and sober, and his daily wage averages less than half that of an American. The best results can be obtained by a sort of paternal supervision on the part of the employer, and this supervision must extend not only over the working hours but throughout the entire day. Attention to housing, feeding, sanitation and amusement will surely result in increased efficiency, cheerfulness and disposition to work, while small concessions made to those who complete the full number of working days per week will secure less unnecessary absences from work. As a rule, time books and pay rolls will show 25% more names of men employed than are actually at work on any given day, but a process of elimination will finally secure a very satisfactory working force. Patience, justice and instruction are indispensable and skilled supervision is a prime requisite. Each foreman must be able to instruct and excel in every branch of the work under his charge. Skilled labor in the American acceptation of the term is somewhat scarce, but the native is imitative and quite adaptable. Machinists and artisans of more or less skill are numerous, and where it is possible to keep a man on one particular class of work he soon becomes fairly expert. During the building of the new harbor works Chinese and negro labor was tried, but in a comparatively short time was eliminated, for the native had proven himself more satisfactory and economical. This work comprised timber work, pile driving, quarrying, ship building, masonry and concrete work, iron and steel erection, dredging and kindred construction, and the natives proved themselves capable, not only in ordinary labor, but as stationary engineers, and in handling pneumatic tools, running derricks and other work which is considered as skilled. The installation of the new electric street railway system was accomplished satisfactorily with native labor entirely, and this included excavation, track laying, ballasting, concrete work, paving, installing machinery, and reinforced concrete building construction.

It is the belief of the writer, borne out by carefully kept cost tables, that the native laborer, properly treated and cared for, will compare favorably in economical results with foreign competitors.

Another point of interest to the contractor is the consideration of Manila as a supply and repair depot. The archipelago is open to the competition of the world and nearly every nation is represented in its trade. English, German, French, Swiss, and Spanish goods, as well as those from the United States, are on sale. Fair stocks of tools, implements, etc., are carried, but large orders for supplies are generally placed with agencies for importation. All governmental purchases are made by the insular agent. There are several fairly well equipped machine shops in the city, including foundries for brass and iron castings of ordinary size. Unusual tools for special work would need to be imported. Cements of various brands are either in stock or can be quickly secured. Both American and European brands are in use, but the local trade is generally supplied with that of Hongkong or Japanese manufacture. For transportation there are several teaming and trucking firms, supplied with American or Australian horses or mules and American wagons, carts and trucks. Probably 100 teams could be secured at a daily rate but little higher than is paid in the western part of the United States. Bar and flat iron is carried in stock, but rolled shapes, except in small sizes, would have to be imported. Two of the largest contracting firms in the United States are already established here, and both seem fully employed. there are also a number of firms and individuals who compete in works of less magnitude.

While these notes refer solely to the works in the City of Manila, attention might also be invited to a large amount of improvements contemplated by the insular government throughout the Islands, as well as to the general scheme of railroad construction now under advertisement.

CANTON-HONGKONG ICE AND COLD STORAGE COMPANY, LTD.

Another page of this issue of THE FAR EASTERN REVIEW shows the prospectus of the Canton-Hongkong Ice and Cold Storage Company, Ltd., which it is proposed to form with a capital of $700,000 (70,000 shares at $10 each), with the object of establishing in the City of Canton, China, an ice plant of 50 tons daily capacity and also 30,000 galls. of distilled water. The reasons presented in the prospectus suggest a splendid investment, and of these the most convincing argument in favor of the enterprise is that in a populous city, and with a large shipping business, there is no ice plant of any description to be found in the neighborhood. It is the hope of the promoters that the plant will be in operation about May 1st, 1906. Careful consideration of the proposition should convince interested parties of the merits of the company.

THE GROWING COMMERCE OF THE PHILIPPINE ISLANDS

(By W. MORGAN SHUSTER, Insular Collector of Customs)

In his last official report the writer of this article had occasion to make the following statement with reference to the fiscal year 1905:

"While trade conditions and customs revenues have not been all that could have been hoped for, there is little cause, all things considered, for discouragement, and on the other hand there are many indications of gradual restoration to normal conditions."

Nothing recent has occurred to counsel a departure from that opinion. It is undeniable that the prevailing sentiment among business men, in Manila at least, is one akin to pessimism, but it is equally true that the reasons for their state of mind are not hard to find, and the cause being known, the remedy is sure to follow.

In order to arrive at any definite idea of the trade of the Philippine Islands, with a view to determining whether conditions are improving or not, it is necessary to analyze with some care the trade statistics of the last year and some previous period, so as to show not only the entire volume of trade, but also the different classes of commodities imported and exported.

It is important to ascertain what portion of the imports for the different periods comprise articles for immediate consumption and what portion thereof enters into improvements of permanent character, calculated to benefit the locality for years to come, by increasing the productive capacity and improving the health conditions of the community, as well as making the Islands more attractive and enjoyable for home seekers.

Careful investigation along the lines indicated has convinced the writer of the fact that conditions have materially improved, considered as a whole, and that the outlook for the future is bright.

This conviction is arrived at from a careful study of trade statistics in all their bearings.

The periods considered are the two fiscal years ended June 30th, 1904, and 1905, respectively.

It is true that by comparing the entire volume of trade, currency excluded, for the Philippine Islands for the fiscal year ended June 30th, 1905, with the previous fiscal year, a decrease is shown, amounting to $212,465, but we should note that the exports of Philippine products show an *increase* amounting to $2,089,738, while imports of commodities, exclusive of currency, show a *decrease* amounting to $2,342,203, as illustrated by the following table:—

Fiscal Year	1904	1905
Imports (*value*).......	$ 33,221,251	$ 30,879,048
Exports (*value*).......	30,226,127	32,355,865
Total trade (*value*)....	$ 63,447,378	$ 63,234,913

It will be seen that for the fiscal year 1905 the total exports of Philippine products exceed the total imports of all commodities, currency excluded, by the sum of $1,476,817, while for the previous fiscal year imports of commodities from foreign countries exceeded the value of exports of Philippine products by the sum of $2,995,124. This is certainly a substantial gain in favor of the Islands, and its tendency is towards better economic conditions.

Furthermore, the decreases in imports have been along the line of articles for immediate consumption, such as food products, as well as in those articles commonly called luxuries.

In the one item of rice a decrease is shown for this last year amounting to $4,092,076, the rice imports for the fiscal year 1904 being valued at $11,548,814 invoice value (exclusive of imports by the Insular Government and military), and for the fiscal year 1905 at $7,456,738. This reduction is attributable to the increased local crops, which have reduced the amount necessary to import, and all indications point to a steady decline in the importation of this article in the future. That this is a most cheering sign nobody will deny. The fact that the local rice crop in the past may have been allowed to diminish because there was more profit in growing hemp does not detract from the present favorable indications—especially in view of the fact that this decided increase in the local rice crop is accompanied by an increase in the exports of hemp and sugar, and only a small decrease in the exports of copra and tobacco, while the total exports of local commodities have increased over $2,000,000. View in any light, the increased rice crop and decreased rice importation for the past fiscal year is a most favorable sign for the future.

The other chief articles of import showing a decrease in the year 1905, as compared with the previous fiscal year, are malt liquors, wines, silks, woolen manufactures, musical instruments and breadstuffs, as is indicated by the following table:—

Fiscal Year	1904 (*Values*)	1905 (*Values*)
Rice..........	$ 11,548,814	$ 7,456,738
Malt Liquors	310,411	278,732
Wines	266,663	193,088
Silks	546,040	480,721
Musical Instruments	51,760	39,694
Breadstuffs	1,096,323	979,935
Woolens	281,429	183,459
Total (*seven articles*).	$ 14,101,440	$ 9,612,367
Total decrease in fiscal year 1905		$ 4,489,073

Still other articles for immediate consumption, particularly in the line of food products have shown material decrease.

The articles showing substantially increased importations during the past year are, as before stated, chiefly of the class entering into permanent improvements, though cotton goods, which are worn here by all classes, also show a marked increase.

The following table gives the principal articles in which an increased importation is shown during the fiscal year ended June 30, 1905, compared with the previous fiscal year:—

Fiscal Year	1904 (*Values*)	1905 (*Values*)
Cotton Textiles ..	$ 4,962,354	$ 6,429,873
Cars for Steam Railway	1,648	44,033
Cars for Other Railway	2,820	60,313
Lumber........	349,451	430,949
Cement.	140,252	236,495
Iron, Steel and Manufactures of	2,412,936	2,646,123
Illuminating Oil.....	485,435	792,897
Paper, and its Manufactures.	490,806	515,061
Agricultural Machinery........	9,892	65,671
Other Machinery......	774,026	893,195
Total (*ten articles*)	$ 9,629,620	$ 12,114,610
Total increase in ten articles..............		$ 2,484,990

The statistics given above do not include any imports by the insular government or military, which, however, were very largely of the class of articles entering into public improvements of a permanent character, such as lumber, cement, and hardware.

Machinery importations embraced many traction engines, rice threshers, etc., to be used in improving roads and promoting agriculture. These facts point unmistakably to a more prosperous future for the Philippine Islands.

Government free entries, not included in the foregoing statistics, included during the fiscal year 1905:—Cement, 10,436,186 lbs.; coal, 154,050 tons; rice, 3,615,558 lbs.; refined sugar, 1,826,408 lbs.; and of lumber and timber more than 2,000,000 ft., board measure.

Imports from the United States during the fiscal year 1905 aggregated $5,830,512, as against $4,843,207, during the previous year, thus showing an increase of more than $1,000,000 in imports taken from the United States, in spite of the decline in the total volume of imports. Other countries naturally showed a corresponding loss in their import trade to these Islands.

The United States practically controls the trade in the line of wheat flour, petroleum, malt liquors, manufactures of paper, machinery and hardware, and compared with the trade of the previous year, the mainland territory has shown an increase of more than 100 per cent in the cotton goods trade. The United States has now risen to a point where it has nearly 20 per cent of the entire import trade of these Islands, and of the exports of Philippine products during the fiscal year 1905, amounting to $32,355,865, the United States received $15,678,875, or nearly one-half of the entire amount, showing a gain of more than $4,000,000 over any previous year.

During the past year there has been considerable decline in the quantity of refined sugar imported, chiefly attributable to the reopening of the Luzon Sugar Refinery, in March of this year, this refinery, which is the only one in the Islands, having been closed for several years past. It is likely that there will be a continued decrease in the importation of refined sugar.

Of the chief articles of export from the Philippine Islands—hemp, sugar, copra and tobacco,—the two first named have shown considerable increase during the past fiscal year, as compared with the previous year, hemp increasing from $21,794,960 in 1904 to $22,146,241 in 1905; and sugar rising from $2,668,507, in 1904, to $4,977,026 in 1905. Copra and tobacco exports showed a slight decrease from those of the previous year. Refined sugar is imported chiefly from Hongkong and the Chinese Empire. Lumber imports come almost exclusively from Pacific Coast points. Woolen manufactures come chiefly from European countries, as do also about 60 per cent of the cotton goods. Fresh meats are imported almost exclusively from Australia.

The increase in trade with the United States has perhaps been one of the most noticeable features of the past year's statistics, and naturally calls for some readjustment in the business circles here.

With the extension of good roads and railroad communication throughout the principal Islands, and the improvement of coastwise shipping, further impetus will be given to the production of articles which are on the gain even under present conditions.

The extensive harbor improvements, which promise to place Manila among the best of the harbors of the Orient, are rapidly approaching completion, and when completed will certainly result in materially increased trade for this port, and will prove beneficial to the business interests of the Islands as a whole.

Thousands of new homes have already been built and the work of construction is progressing steadily and rapidly here and at other points in the Islands. This fact tends to increase confidence in the future of the Philippine Islands and to insure the permanency of satisfactory trade.

In the readjustment of trade growing out of changed conditions, it is possible that larger and more extensive business concerns will, to some extent, take the place of smaller ones thus causing complaint in individual cases, but in the main trade conditions will be brought closer to the modern standards of the larger cities, and the public generally will probably reap the benefit of closer margins on sales.

As better roads and railroads develop the timber resources of the Philippine Islands, the necessity for the importation of lumber will be somewhat diminished, since many of the native woods are better adapted for building purposes in the tropics.

On the whole, without seeking to be unduly optimistic, it may be safely said that so far as accurate commercial statistics enable us to judge of the future of business here, the outlook is good, and it will be extremely surprising, if the many good signs and tendencies in last year's trade do not still further develop within the next 12 months.

RAILWAY CONSTRUCTION IN KOREA REVIVED UNDER JAPANESE SUPERVISION*

Railway construction has been progressing towards completion with satisfactory rapidity in Korea since the war in the N. came to an end. The Japanese, with their usual enterprise, are forcing through to realization the many lines whose construction was more or less interrupted by the military campaign against the Russians, and those projected in Korean territory, with the result that today the slow old methods of transportation and their attendant drawbacks to commerce and passenger traffic are rapidly being overcome. The Seoul-Wiju line was recently opened to traffic as far as Pyongyang, and in Manchuria the Japanese engineers have opened railway communication between Liaoyang and Antung,

Work on the Seoul-Gensan line is now well under way, and it is hoped that the road will be completed by the end of the present month. The trunk line from Fusan to the Yalu and from Antung to Liaoyang brings Japan into direct touch with the Chinese Eastern Railway, the Siberian Route, and Europe in that the regular steamship service between Fusan and Shimonoseki, recently established by the Sanyo Railway Company, is now in operation. The Seoul-Wiju line is in reality a continuation of the Seoul-Fusan Railway and there is every indication that the two properties will soon be amalgamated.

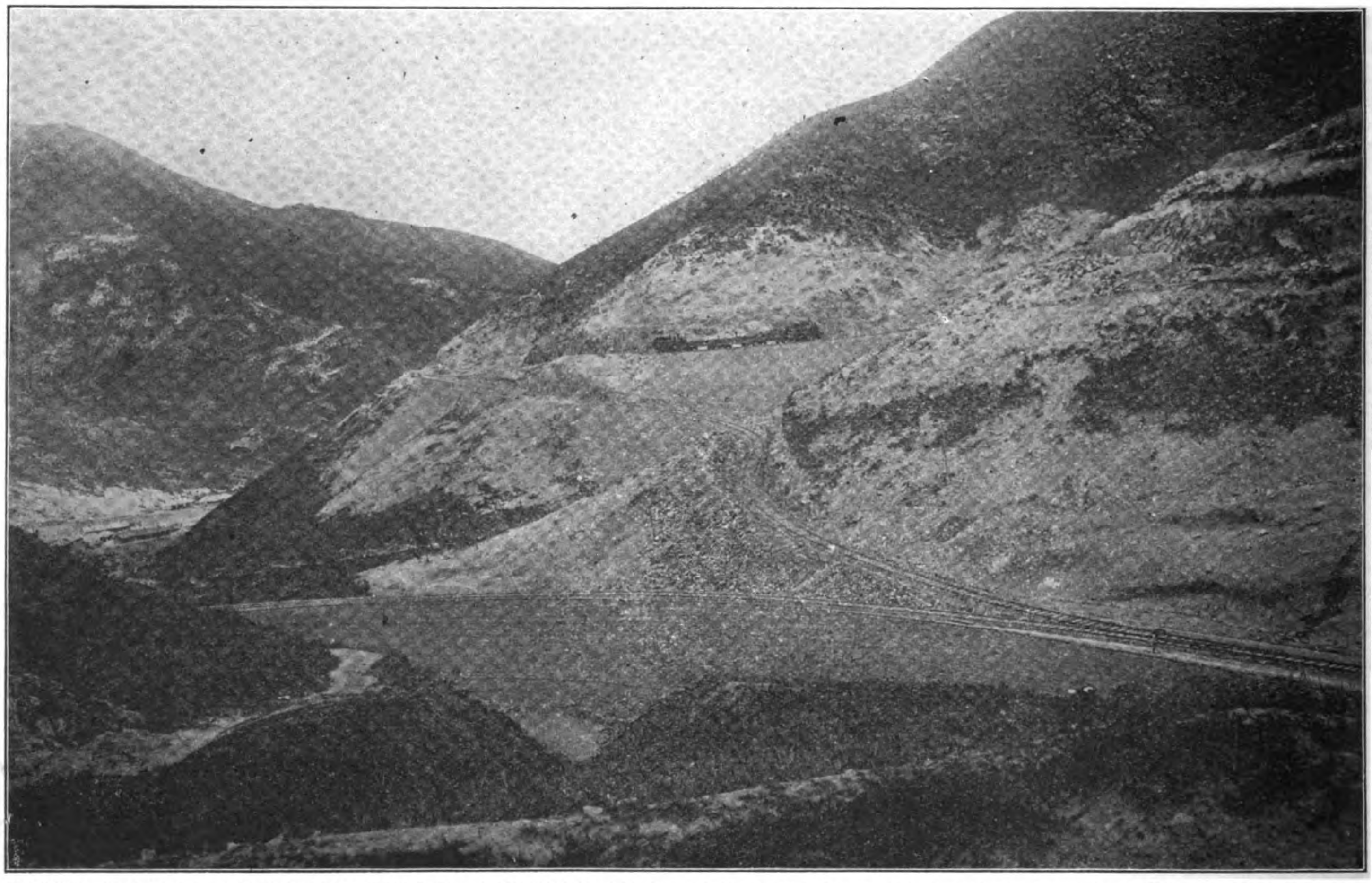
FINANCIAL PROSPECTS.—Indications are that Korean railways will prove a good investment. The last annual report of the director of the Seoul-Fusan Railway counts for little, however, that is encouraging; but conditions have been so extraordinary, from the outbreak of the Russo-Japanese War to the present, that a fair estimate of the earning powers of the lines is not possible at this time. This report showed the condition of business on the Seoul-Fusan and Seoul-Chemulpo lines.

In his address to the shareholders Dr. Furuichi, director of the company, showed that most of the intermediate stations on the Seoul-Fusan Railway were situated in the poorest of villages and the goods carried by the railway mainly consisted of agricultural products of the neighborhood. Even these were mostly carried by waterway or on horseback, so that the railway receipts in this connection did not amount to much, the daily receipts averaging -Y-9.048 per m. Since 1904 the Japanese had been emigrating to Korea in large numbers, and with the opening of the Seoul-Wiju line the receipts of the Seoul-Fusan road would decidedly increase. The receipts of the Seoul-Chemulpo line showed a decrease of about 13 per cent as compared with first half of 1904. This decrease was due to a diminution in the transportation of war materials required for the construction of the Seoul-Fusan Railway, as well as to a change in the tariff fare on January, 1905.

SEOUL-FUSAN RAILWAY.—According to the *Korea Review* it was at the beginning of 1905 that the Seoul-Fusan Railway was opened for general traffic. Now a few hours' dash across the Straits of Korea is all the sea-travel necessary between Seoul and Tokyo, and it is more than likely that within a few years the Straits of Dover will be all the water to be crossed in going to London.

At first the Seoul-Fusan trains started from Yong-tong-po. Now the train starts from Seoul. Branching off from the Chemulpo line at Yong-tong-po, it turns to the S. and sweeps around the base of Kwanaksan giving some magnificent views of that grand cluster of rocky peaks. Suwun, with its thickly wooded mountain, is reached in about 1 h. from Yong-tong-po. Here the road skirts an extensive irrigation reservoir on one side and a fine stone quarry on the other. Throughout this whole section, at least for a distance of 50 ms. from Seoul, the country is finely wooded, extensive forests being continually in sight. After that the country becomes less heavily wooded until in the vicinity of Kongju only an occasional clump of trees is seen. In the town of Chuneui 2 tunnels are passed, each of them being approximately 100 yds. long. Nothing too good can be said of the workmanship on this road; the roadbed is excellent and for a considerable part of the way is ballasted with stone. The rails are very heavy, contrasting in this respect very favorably with those of the Siberian Railway, whose rails, in 1903 at least, were hardly heavier than those of the electric tramway in Seoul. The ties of the Japanese road are very heavy and made of a wood much resembling the ash. Here again there is a striking difference between the Japanese and Russian work, for the latter road has, for thousands of ms. ties that are simply round sticks of 8-in. diameter split in two, the rails resting on the rounded side. A very few weeks suffice to sink the rails deeply into the soft wood. The average time between Seoul and Fusan is about 20 ms. per h. which exceeds the time of the express on the Siberian line. Over parts of the Korean line a speed of 35 ms. per h. is made. This is quite unheard of on any portion of the Siberian line. If a mixed train can make this over the Seoul-Fusan road an express can easily do 40 or 45 ms. The important point is that the road-bed is so solid and the masonry work so unexceptionable that the possible speed will depend entirely upon the engines and weight of train. It was the bad condition of the road-bed that retarded speed in Siberia.

ROUTE FROM KONGJU.—This road passes Kongju at a distance of some 20 ms. and then branches away to the E. to climb the two ranges of mountains that lie between the valleys of the Keum and Naktong Rivers. The work of mounting the first great pass is an arduous one, for the tunnel at this point is not completed

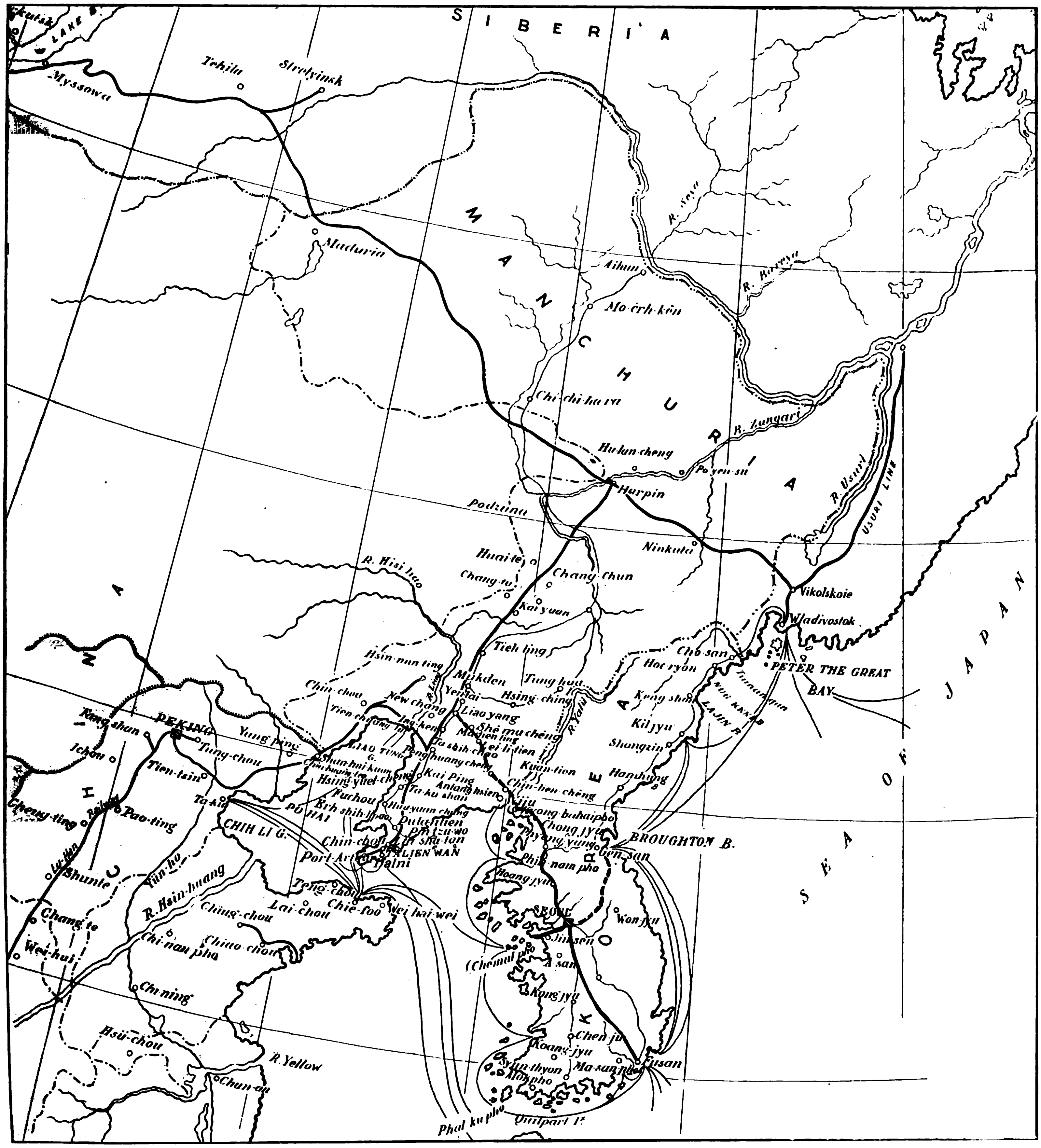


KOREAN RAILWAYS.—TEMPORARY SWITCH-BACK ON SEOUL-FUSAN RAILWAY BEHIND KONG-JU, BY WHICH A PASS WAS CROSSED BEFORE THE TUNNEL WAS COMPLETED.

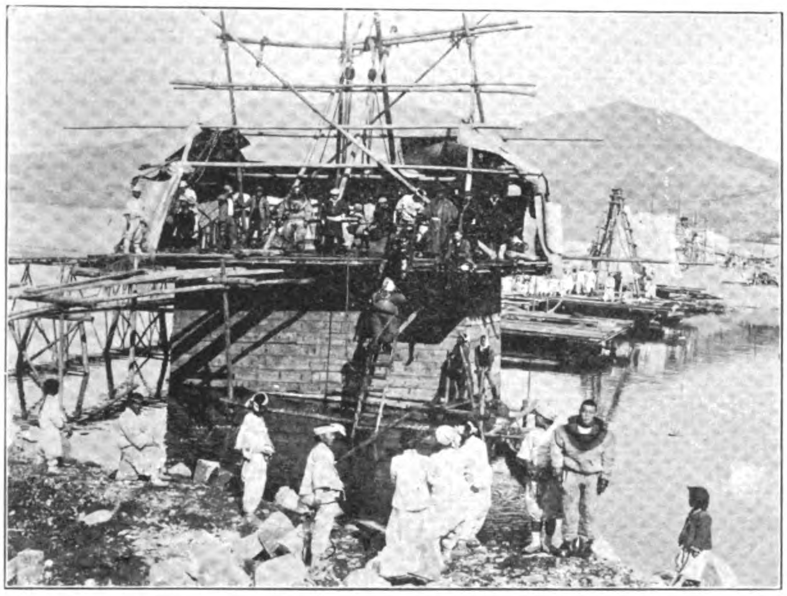
* Illustrations through the courtesy of Mr. Fink editor of the *The Far East*.

and the road literally climbs the hill. The grade at one point is very steep. This will all disappear as soon as the tunnel is completed. Steep as it is, this pass does not have to be surmounted by a switchback or any other such mechanical trick, but we had to have an engine at each end of the train. Through this rough region the masonry work is exceedingly fine, and money must have been poured out like water. The road passes through the hills at a high elevation, and the valleys deep beneath with their clustering villages and checker-board rice-fields, pass before the eye like moving pictures.

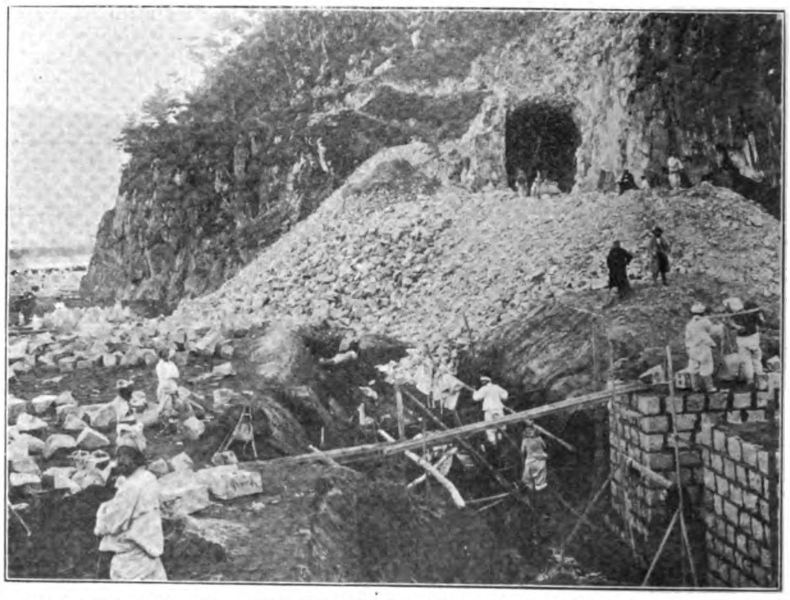
Passing down the E. side of this range, you cross a tributary of the Keum River on a temporary bridge. The approach to this bridge down the side of the mountain is one of the most beautiful on the whole road. Later on the second range is passed. Here is also found an unfinished tunnel, apparently one of the most considerable on the line. Comparatively little of it is done as yet, for at the W. end the hill had not been entered more than 30 or 40 ft. The road passes over the summit, and on the E. side requires a single switchback in order to come down to the level of the valley.



KOREAN RAILWAYS.—MAP SHOWING OPERATING AND PROJECTED RAILWAYS OF KOREA AND THEIR RELATION TO THE TRADE CENTERS OF NORTH CHINA, MANCHURIA, AND THE SIBERIAN LINE.—CONSTRUCTED LINES, ———; PROJECTED LINES - - - -.



KOREAN RAILWAYS.—A BRIDGE IN CONSTRUCTION.



KOREAN RAILWAYS.—UNFINISHED TUNNEL AT THE SECOND MOUNTAIN.

TAIKU TO FUSAN.—Shortly after leaving Taiku the train climbs the ascent to the mouth of the great tunnel. This is the most arduous feat the engineers had to perform. The tunnel is upwards of 4,000 ft. long. The approach from neither end is particularly picturesque, but it is a good illustration of the determination which has marked the progress of Japanese enterprise in Korea. The road now leads along the long reaches of the Naktong River until lights on the shipping in Fusan Harbor and finally into the terminal station, which stands half way between old Fusan, at the head of the bay, and Fusan proper at the foot. Two years have worked wonders in this port. The reclamation company has literally pulled the hills down into the water, and now there is a broad band stretching down the shore of the bay for 1 m. or more. In places the sea wall is built up from a point 35 ft. below the surface of the water.

An enormous freight traffic was formerly carried on by flat-boats on the Naktong River. These boats were towed by men, and it took 1 mo. to reach Taiku. The railroad has practically killed this traffic, and a large number of people have had to find employment elsewhere; but to thousands and tens of thousands of people in the interior the cheapening of transit rates and the avoidance of the likin dues on this river have proved an unmixed blessing. The impetus given to trade of all kinds is rapidly giving occupation to all the people displaced and to hundreds besides.

CONSTRUCTION AND EQUIPMENT.—All the rolling stock has been imported from the United States. The locomotives are built by the Baldwin people of Philadelphia, the cars are also of American build, and the 90-lb. rails come from the Carnegie Steel Works.

Many of the stations, numbering altogether 53, have been finished The framework is constructed of wood, with walls of bamboo plastered over with mud, and the roofs tiled. Very neat they look, and so also do the Japanese houses along the railway—a striking contrast to the untidy and broken-down huts in which the Koreans live. All along the line there are Japanese soldiers, armed with rifles, supervising the building of the road and the bands of coolies at work. At Yong-tong-po the new line joins the railway running from Seoul to Chemulpho, the most important treaty port on the NW. coast of Korea.

The work on the Seoul-Fusan line has been carried out under the superintendence of Professor Furnichi and Mr. Oya and a large staff of engineers. The cost of construction has been £10,000 per m. The gauge is 4 ft. 8½ ins., and the steepest gradient 1-50, the sharpest curve being one with a radius of 15 chains. Altogether there are 26 tunnels, the 8 longest being the: Songhwa, 3,948 ft; Muwulsan, 1,452 ft.; Pusang, 1,180 ft.; Hwang-Gany, 990 ft.; Kuipok, 924 ft.; Cheungyak, 858 ft.; Wolyon, 848 ft.; and the Hwakwan tunnel 825 ft. The 96 bridges have a total length of 23,794 ft.:

	Feet.
Crossing the Han River	2,054
" Nakdong River	1,436
" Keum-ho River	1,217
" Keum River (2)	1,015-824
" Mil-Yang River	979
" Kyongho River	848

In addition to these there are some 500 smaller bridges with a total length of 3,418 ft.

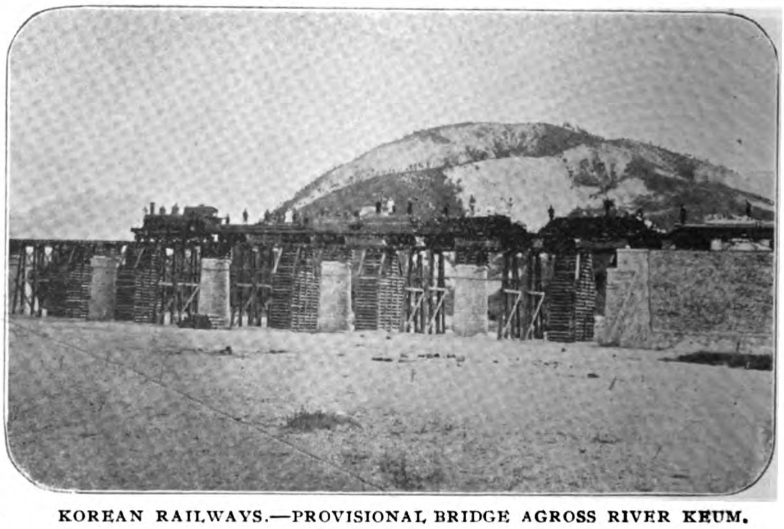
ERROR IN AN ADVERTISEMENT

In spite of the utmost vigilance there are times when the best regulated newspaper office will commit an error that might operate to the detriment of one or more of its most highly esteemed patrons. An instance:—In the full page advertisement of the Kelly-Springfield Road Roller Company, which appeared in the November issue of *The Review*, there was printed the cut of a sugar mill. This illustrating block represented a mill which is built by Messrs. John McNeil & Co., of Glasgow, for which firm the Manila agents are Messrs. Fred. Wilson & Co. While the local agency of The Kelly-Springfield Road Roller Company, of which Mr. C. E. Helvie is manager, handles sugar machinery of every description, it does not handle the machinery built by Messrs. John McNeil & Co. Therefore, the publication of the cut in connection with Mr. Helvie's agency should not have occurred. It was a mistake, unwittingly made, which is regretted.

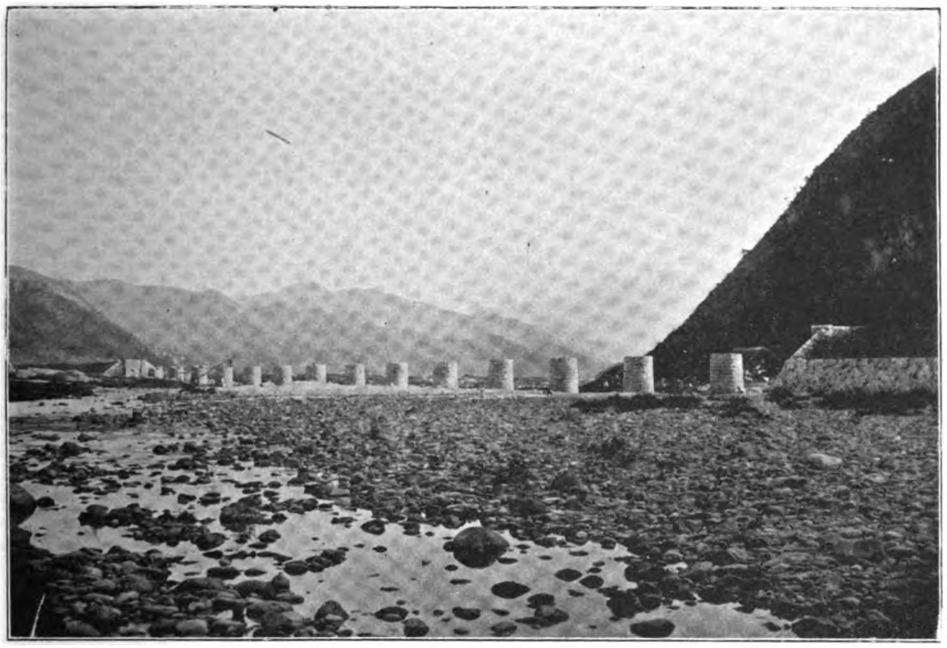
ATLANTIC, GULF AND PACIFIC COMPANY

As the old year draws to a close the well-known engineering and contracting concern, the Atlantic, Gulf and Pacific Company, finds itself exceedingly busy in the Philippines. Originally, its efforts were concentrated on one big job—the development of Manila Harbor. Now, besides work on the additional break-water, which the company will finish by New Year's Day, it is building the extension to the E. breakwater; driving the bulkhead in front of the Luneta; pumping mud on the original filled area; building the Pasig River wall by the Bridge of Spain; erecting a concrete-steel cathedral for the Protestant Episcopal Church in Malate; erecting a central station for the Philippine Islands Telephone and Telegraph Company, also of concrete and steel; raising a vessel for the Navy Department

KOREAN RAILWAYS.—QUARRY FROM WHICH STONE MATERIAL WAS TAKEN.



KOREAN RAILWAYS.—PROVISIONAL BRIDGE AGROSS RIVER KEUM.



KOREAN RAILWAYS.—PIERS FOR A PERMANENT BRIDGE.

at Cavite, sunk during the recent typhoon; building a dredge for the Navy Department at Olongapo; furnishing ties and rails for about 2 ms. of track for the Quartermaster's Department, U. S. Army; putting in foundations for the Ayala Bridge across the Pasig River, and in due time will put a steel bridge thereon; erecting a bridge at Aparri; building a dock at Jolo; completing seawall and filling at the Commanding-General's residence, Malate, and numerous other smaller jobs. The prestige which the Atlantic, Gulf and Pacific Company has established for itself in the Philippines and throughout the Far East is attributed mainly to the efficient management of Mr. H. Krusi, 1st vice-president of the company, and Mr. Wickham Quinan, the company's office manager in Manila.

AMERICAN TRADE WITH CHINA

According to the New York correspondent of *The London Times*, representatives of the leading Suez steamship companies and transcontinental lines have decided to raise the rates on cotton goods shipped to China. The new rates are expected to go into effect July 1st, 1906, and will be as follows from southern mill points:—Overland rates, $1:25 per 100 lb.,; and *via* Suez Canal, c.62½. The present Suez Canal rate is 22s. 6d., or about $5 c.62½. The measurement rate of cost will be abandoned entirely for the basis of weight, as the latter is considered more just. Owing to excessive competition, the rates on merchandise sent to China have been going steadily down for about 3 yrs., and at one time were as low as $2:50 per ton. It is understood that the contemplated increase will not affect the big trade with China in machinery, tools, implements, and canned goods, but only cotton goods. The report is creating a good deal of interest, owing to the large purchases of cotton goods by Chinese buyers already made for shipment well into next year. In this connection it may be added that during the past few weeks there has been sowewhat of a revival of activity among Chinese buyers after the period of dullness. On the present movement some 25,000 to 30,000 bales of goods have been taken, principally 3-yd. sheetings, and deliveries extend as far ahead as October of next year. In all cases full prices have been paid. The most recent inquiries cover a broad range of goods, and in some cases call for very light weight sheetings. Knit goods have also been taken fo export in increasing quantities.

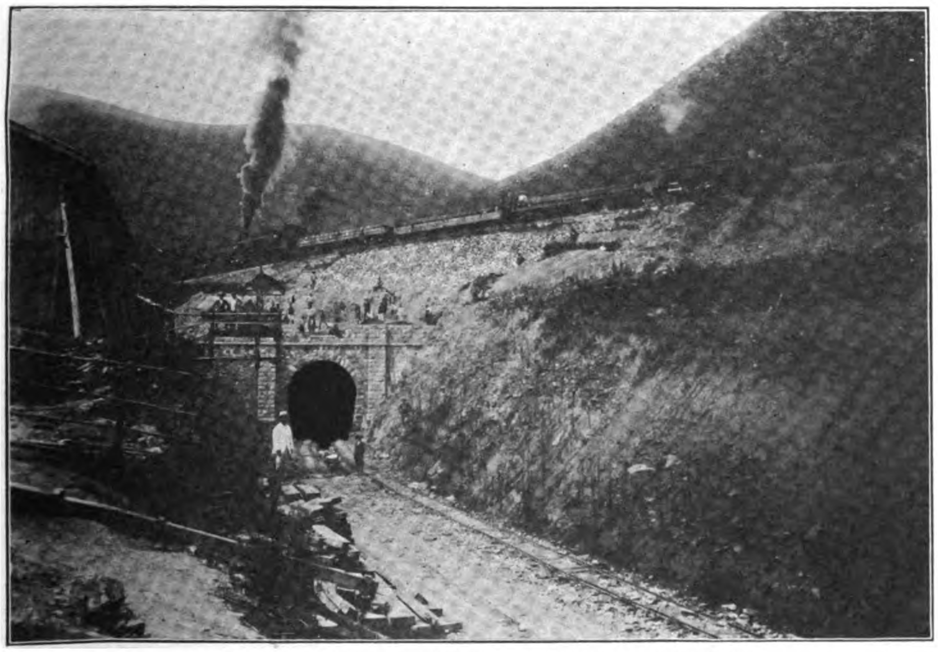
COAL IN MANCHURIA

According to L. Pervinquiere, the coal seams near Mukden, in Manchuria, are intercalated among grits and shales. Small coal basins are fairly numerous in the Liaotung peninsula; as at Wuhoshin, on Society bay, where several seams, varying from 3 to 13 ft. in thickness, of friable coal have been worked; at Talienwan; at Saimaki, on the Korean frontier, where a seam (3 to 5 ft. thick) of crumbly bituminous coal occurs. At Pönnhsihu, southeast of Mukden, five or six seams of coal, each 1 or 2 ft. thick, have been proved; the conditions appear favorable for working, but the strata are much faulted. The mineral is friable, though not specially bituminous, and yields coke of middling quality. None of these coals are suitable for naval purposes or for locomotives, nor would it pay to export them. Good anthracite, however, has been found in Liaohsi.

In N. Manchuria the true coal measures are not so well developed, but coal seams of later age (Triassic, Jurassic and Tertiary) crop out at several localities in the upper Sungari valley, in the neighborhood of Kirin, in the Argun valley, where there is a thick seam of lignite.

It is expected that the coal-mining industries will witness a great expansion during the next few years. Japanese companies are planning to open up a number of new mines, and experiments are being made with washing plants, with the view of improving the quality of the product of existing mines. Railroad connections with the coalfields will be largely extended.

KOREAN RAILWAYS.—VIEW OF RIVER MAKONG FROM RAILWAY RIGHT-OF-WAY.



KOREAN RAILWAY.—TUNNEL NEARING COMPLETION.

HONGKONG=AMOY=MANILA LINERS "RUBI" AND "ZAFIRO"

On the adjoining page will be found a series of photographs illustrating the splendid steamship service of the China and Manila SS. Company, Ltd., between Manila and Hongkong, the vessels of which occasionally calling at Amoy.

The vessels permanently on this run are *Rubi* and *Zafiro*. They were built by Messrs. D. J. Dunlop & Co., Ltd., at Glasgow, in 1901, especially for this service, and their popularity since they have been in comission proves the foresight of the company in providing extravagantly for the constantly increasing 1st-class passenger travel back and forth over the China Sea. The officers of both ships are gentlemen, courteous and obliging; and at all times they are on the alert to make passengers comfortable during their voyage of about 48 hrs. duration across the waters.

Rubi and *Zafiro* are sister ships, practically of the same tonnage and general design. They are steel screw vessels of about 2540 tons register, being approximately 294.8 ft. in length, with a beam 40.8 ft. and a depth of 22 7 ft. Having been designed especially for this trade, both *Rubi* and *Zafiro* are so arranged that the staterooms and saloons are well ventilated and cool at all times. The electric equipment is of the most modern departures in marine electrical engineering. Every portion of the ships, from the foremast light to the stokehold, is lighted by electricity, and saloons and staterooms are cooled by electric fans.

The social hall, smoking room and dining saloon are models of comfort and luxury. Elegantly upholstered lounging chairs make the voyage more tolerable for those who are afflicted with *mal de mer*. A carefully selected library tempts the passengers of literary inclination, while there is a broad awning-covered promenade deck for those who care to walk or compete in the conventional ship games.

The *cuisine* is unexcelled in this quarter of the globe. A competent steward, assisted by a small army of *chefs* and long-coated, silent Chinese servants, provides all the creature comforts one's heart could desire.

The efforts of the gentlemanly officers to promote social life on these splendid steamships have not a little to do with the popularity of *Rubi* and *Zafiro*. Captain R. W. Almond, who commands *Rubi*, because of his long service, intimate acquaintance with the China Sea, and his never-failing courtesy and attention, has earned the sobriquet of "Commodore of the Fleet." Many of those who have been fortunate enough to make the short voyage to Hongkong and back with him—for generally they want to come back on his boat—have some tall yarns to repeat about the wonders of the deep—viewed through "Commodore" Almond's glasses. First Officer Notley and Chief Engineer Hill are also numbered among the popular officers of *Rubi*, with whom passengers come in contact.

Captain R. Rodger, the able commander of *Zafiro*, also has a large following of friends and admirers who profess to believe that the trip across can only be safely made on his steamship. First Officer Frazer and Chief Engineer Henderson are his lieutenants in the social hall as well as in his management of the steel liner over which he is master.

Both *Rubi* and *Zafiro* have become firmly established as favorites with the traveling public of Manila, and seem to be destined to remain so for many years to come. The general managers of the China and Manila SS. Company, Ltd., are Messrs. Shewan, Tomes & Co , of Hongkong. At Amoy the interests of the company are in charge of Messrs. Tait & Co. Both of these firms are well known throughout the Far East. The Manila agents are Messrs. Warner, Barnes & Co. Everywhere all agents of the Manila and China SS. Company, Ltd., treat travelers with uniform courtesy.

COMMERCE AND INDUSTRY IN MANCHURIA

The new American consul at Newchwang recently furnished an interesting report regarding commerce, agriculture, and industry in Manchuria. He says in part:—

"American goods in Manchuria are sold on their merits. American cotton goods are the best in the market; so is the kerosene oil, and hence the large sales. America sells more to, and Japan buys more from Manchuria than any other nation. Chinese consumers say American cotton goods are not made for looks or show. On the other hand, some of the Chinese and Japanese goods in a similar line are found to be a sort of imitation of the American product, and this adds to the popularity of the fabrics that will wear. At the same time, however, the Japanese and Chinese methods of manufacture are improving. This fact must be kept in mind in considering future business. In the Far East, as elsewhere, where there is an open market, the consumer is looking for the best bargains.

"The Chinese of N. China are very much like those of S. China —they are careful, close buyers. They will buy to the best advantage, provided there are no restrictions placed upon trade. One of the largest dealers in American cotton goods here or elsewhere in the Orient informs me that the manner of wrapping a bale of cotton goods may decide its sale, quality being equal or almost equal. For instance, if the Chinaman who buys the bale observes that in wrapping it the manufacturer or packer has put in plenty of covering he may purchase that particular bale in preference to another stock which has been wrapped in a manner that will give the man who breaks the package but a very slight 'squeeze ' in the way of coarse cloth wrapper.

"The American cotton goods sold here are handled through Shanghai almost entirely, and therefore the movement to boycott American goods on account of our treaty relations has been felt in this port in two ways. The strongest influences originated with Shanghai parties and were largely beyond the control of local, Newchwang, counteracting arguments. Other influences were of local origin, resulting mostly from Tientsin newspaper agitation. Several meetings were called for the purpose of securing united action among Newchwang merchants in opposition to American goods but in all instances leading Chinese merchants, who had expressed favourable opinion regarding those articles of American manufacture that are sold here, were present. They strongly opposed any agitation, and although the Chinese circulars issued on these occasions, and originating in Shanghai, called for some immediate and positive action, no organized movement in the nature of a boycott has followed. Many leading Chinese merchants state positively that no boycott of American goods will be sanctioned by them, and that the anti-American agitation will die out. While it is true that a few of the N. Chinamen seek to migrate to America, the major part of the aggressive Chinese merchants in N. China come from S. China, and, therefore, it is, presumably, easier than otherwise would be the case to enlist their sympathies in a movement originating among their former friends or acquaintances. Briefly stated, the American cotton fabrics sold here are in the lead, because the purchasers find them the best the market affords.

"When the Chinese cotton mills started it was predicted that they would eventually supply the needs of the Oriental market. The Chinese cotton producers, in resorting to various methods of squeezing, virtually killed the goose before it began laying golden eggs. They attempted to obtain high prices by cornering methods, they utilized unfair methods in attempting to increase the weight of the bale; and such methods, coupled with the fact that the Chinese cotton product did not equal that of the United States, crippled the industry in China, at least temporarily. Now, however, these defects and obstacles are being removed, some Japanese manufacturers are becoming interested in the Chinese mills; better methods prevail, and with markets favorable and friendly to the Oriental product the outsider will necessarily have to offer, in due time, additional induce ments.

"With the Russians removed from this market, the American kerosene oil has a practically clear field. For a time during Russian occupation the American product was threatened through influences that were brought to bear on the local trade in favor of the Russian product. With oil coming without breaking cargo direct from Philadelphia to Newchwang, the unprecedented receipts of 1904 will be outdone, and the E. part of Asia will have little chance to compete with the American product. American lumber, canned goods, flour, cigarettes, sewing machines, and cooking and heating stoves find a market in Manchuria, and the demand at present for these and similar articles is steady and continues in a limited way."

SINGAPORE HARBOR SCHEME

Engineering and other contractors of the Straits Settlements are considerably wrought up over the decision of the British Government in regard to the new harbor improvements projected there and what is affirmed to be its prohibition of local tenders.

The cudgel has been taken up for the local contractors by *The Straits Budget*, which says that Straits millions will fatten the crown agents' *kongsi* as a result of the "improvement job" while Straits contractors will not get even a sub-contract. The *Budget* says that Colonel A. Murray, the Colonial Engineer, has admitted that there was a certain amount of truth in the claims of the Straits contractors, but the government (and he was speaking unofficially) had to consider whether a firm allowed to tender had sufficient capital and plant, and could give a large security for the proper execution of the work. Mr. Palliser had desired to tender for the work, but the Government could not see its way to sanction this, for the whole thing was arranged between the Consulting Engineers and the Secretary of State. "And," added the Colonial Engineer, "the tenders are from those contractors with a known reputation for dealing with this special class of work "

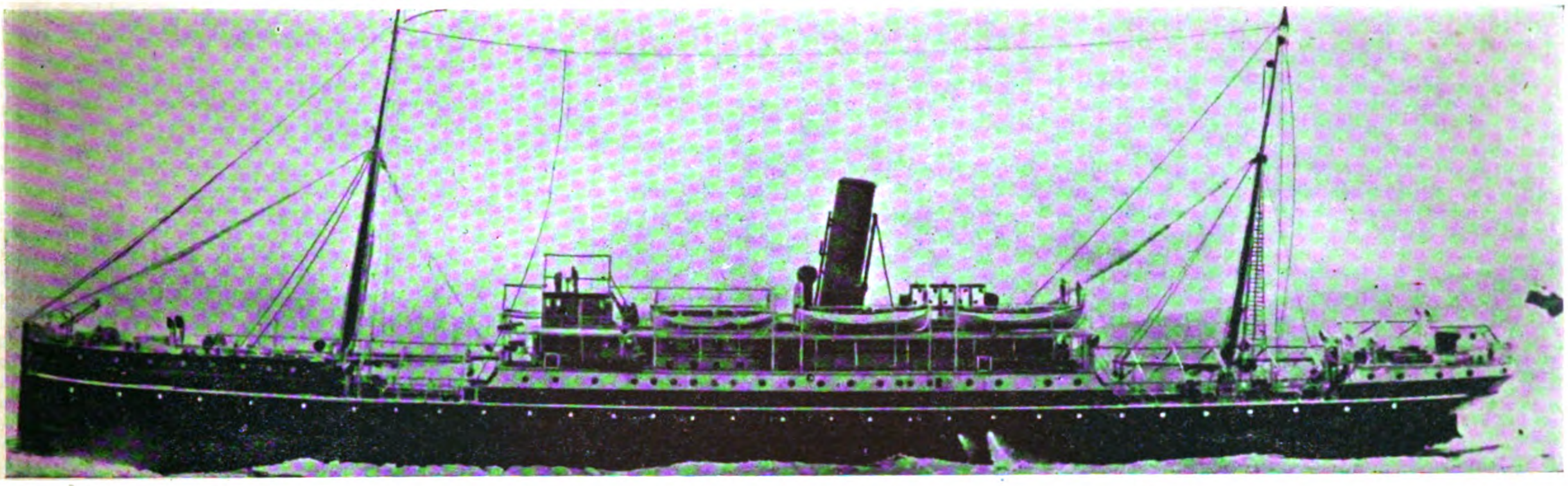
In response to an inquiry, Colonel Murray remarked: "It is not everybody in England who has been asked to tender, but only contractors who are proved to be thoroughly reliable men in every regard. Probably the men here (in the Straits) who wish to take up the contract don't realize the difficulties in the way."

Again, unofficially, Colonel Murray thought local men could seek employment by working under the accepted contractor, but he added that he thought in the specifications it was provided there should be no sub-contracts. He, however, returned to his original observations with reference to the importance, the necessity, of placing a colossal undertaking of this nature in the hands of people of substance and repute.

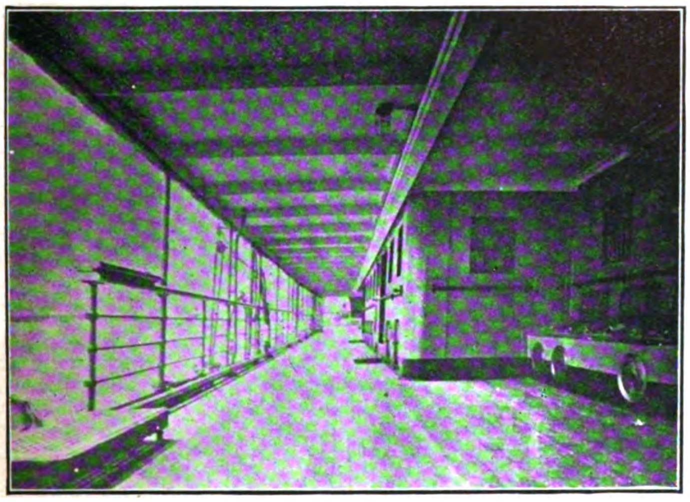
Continuing, he said: "The representative of Pearson & Sons, who are carrying out the work of construction of the Imperial Dock at Dover, and a representative of the firm of Wills, who are carrying out the great works at Gibraltar, have decided to be on the spot to investigate conditions for themselves. About half a dozen firms have tendered." Colonel Murray then called the *Budget's* representative's attention to the report by Messrs. Coode, Son, & Matthews on the "Proposed Harbor Improvements at Singapore" dated February 15th, 1904, paragraph 89.

This states: "Tenders would, of course, only be invited from experienced contractors, possessing the necessary capital and plant. We consider that offers could be obtained from at least 6 such firms, on lines corresponding with those adopted by the Admiralty in the case of contracts let by them within the last few years "

And to this the Colonial Engineer thought there was nothing more to add.

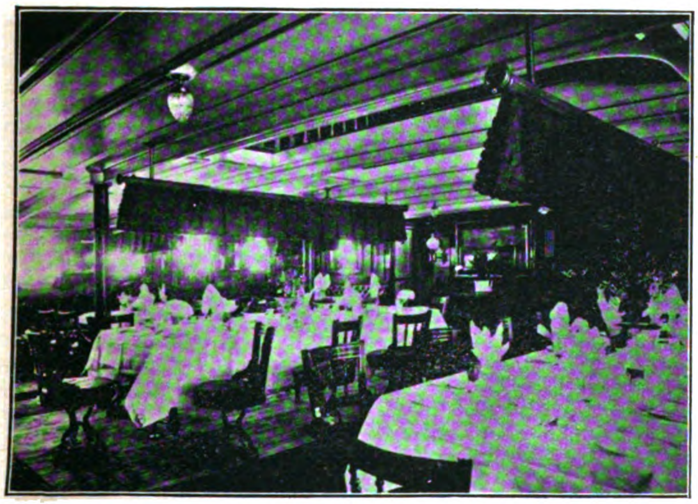


CHINA AND MANILA SS. COMPANY'S LINER *RUBI*, SISTER SHIP OF *ZAFIRO*.

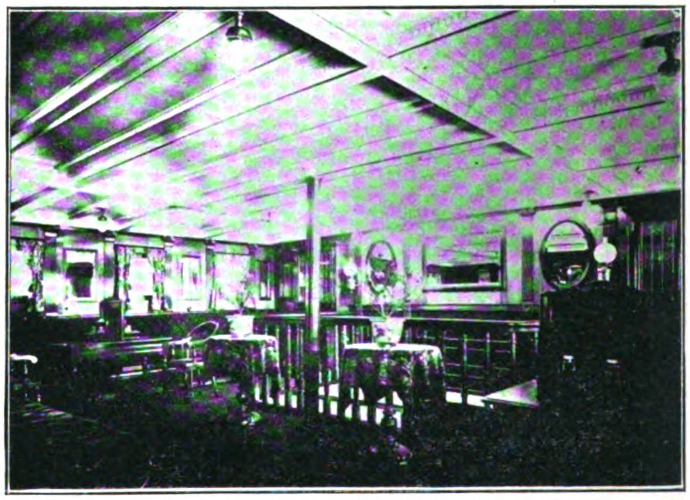


UPPER PROMENADE DECK.

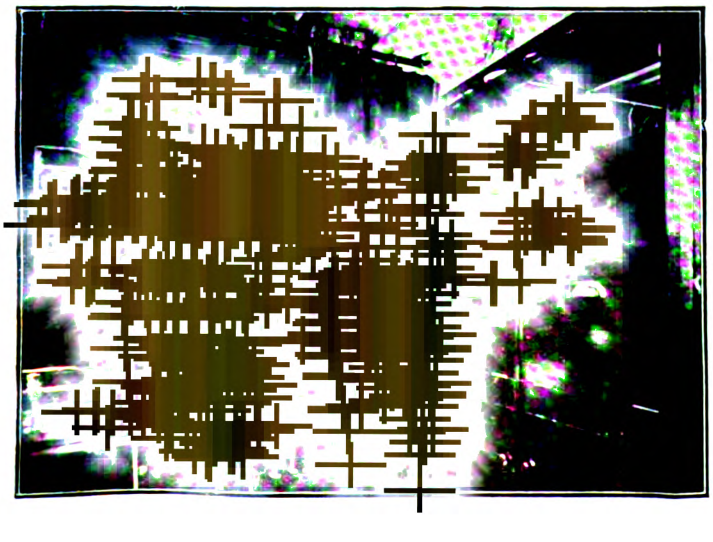
ENTRANCE HALL.

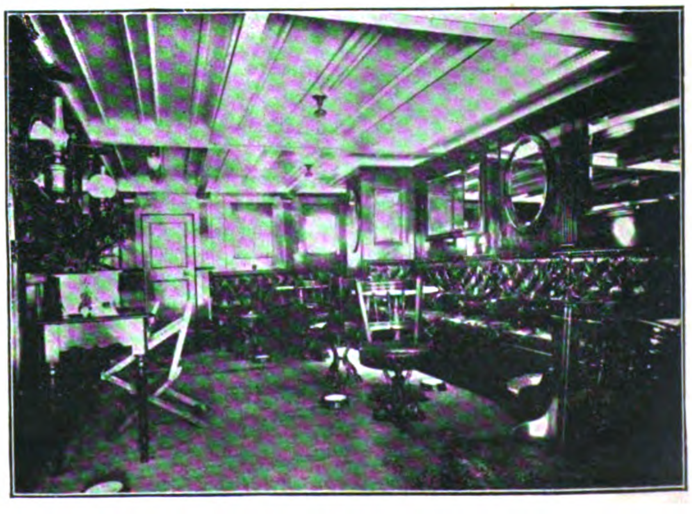


DINING SALOON.



SOCIAL HALL.





CHINESE ENGINEERING AND MINING COMPANY, LTD.

The report of the directors of the Chinese Engineering and Mining Company, Ltd., whose head offices in China are at Tientsin and whose interests in the Far East are under the able direction of Major W. S. Nathan, R. E., submitted at the fourth annual general meeting of the shareholders, recently, held at Winchester House, Old Broad st., London, recently, is as follows:—

The directors beg to submit herewith the audited accounts for the year ending February 28th, 1905. The profit and loss account for the year, after providing for interest on the debenture issue, the sum of £10,000 attributable to the year in respect of the redemption of debentures, and the expenses of administration in Europe, shows a balance of £162,959.5s.6d. Out of this sum £11,000 has been provided to cover the costs of the action which was referred to at the last general meeting, and £40,000 has been transferred to the reserve for depreciation account (as against the sum of £20,000 transferred last year), leaving a net profit, subject to provision for income-tax, of £111,959. 5s. 6d., which, together with the sum of £1,395. 16s. 2d., brought forward from last year, makes a total of £113,355. 1s. 8d. An interim dividend of 1s. per share in respect of the profits of the year was declared on June 22d, last, absorbing £50,000. The board propose that a further dividend of 1s. per share be declared, free of income-tax, making 10 per cent for the year, which will leave a balance of £13,355. 1s. 8d. to be carried forward to the next account, subject to provision being made for income-tax. The debenture issue has been reduced during the year by the sum of £58,040: £10,000 having been drawn for redemption in the usual course on December 31st, last, and debentures to the amount of £48,040 having been purchased at a discount and cancelled, the amount of the discount being £2,168. 2s 8d. During the year three of the company's steamers have been sold at satisfactory prices, the total realized being in excess of the inventory value. A new steamer, *Kaiping*, specially adapted to the requirements of the company's trade, with loading capacity of 3,540 tons and extensive passenger accommodation, was laid down on the Tyne in February last and launched in June last, and is now making the outward voyage to China. The cost of this steamer is approximately £42,000. Since the autumn of 1904 the port of Ching-wantao has been thrown open to the reception of shipping throughout the year. Extensive buildings have been erected at the port on behalf of the Transvaal Labor Importation Agency in connection with coolie emigration and for the Imperial Maritime Customs, as well as buildings for the company's own purposes. The directors retiring in rotation are colonel Albert Thys, Mr. Edmund Davis, Mr. G. T. Symons and Mr. W. F. Turner, who offer themselves for re-election. The auditors, Messrs, Annan, Kirby, Dexter and Co., retire in accordance with the articles of association, and, being eligible, offer themselves for re-election.

In moving the adoption of the report, Mr. W. F. Turner said:—

It was a great satisfaction to be able to say, in the words used a year ago, that the accounts dealt with increased sales, increased profits, increased reserves, and an increased dividend. As to the debentures purchased and cancelled during the year it really represented the investment of a portion of the reserve accumulating out of profits for the past few years, and which had now reached £80,000. In no other way could they have utilized the money in so advantageous a manner. The profit and loss account showed a total increase on the credit side of over £55,000, of which £52,712 was increase of gross profit in China, the total to the credit of the account being £210,088. One item in the accounts was law costs, estimated at £11,000. This was due to the action in the English courts, which had been referred to in the last two general meetings, arising out of the purchase of the company's undertaking, the company being one of several defendants. It was stated at the general meeting two years ago that the object of the action was to enforce the terms of a memorandum dated February 19th, 1901, with reference to the formation in China of a local board for the administration of the company's business there, and the appointment of Chang Yen-mao as director-general there, and that the board of directors were not a party to this memorandum, and had, in fact, no knowledge of it until afterwards, and they were advised, and believed, that it had no legal effect whatever. The trial took place in the early part of this year, and was an extremely protracted one, judgment being given on March 1st, last. The court held that the memorandum was binding upon the company, and that effect must be given to it, and the company was ordered to pay the plaintiff's costs. The amount stated in the accounts includes the taxed costs of the plaintiff and the provision of a sufficient amount to cover the company's own costs. The directors were advised by most eminent counsel to appeal against the judgment in certain important respects, and notice of appeal was lodged at the end of April last. Under these circumstances it was impossible to discuss or comment on the subject. As to the coal trade for the past year, the output was 876,725 tons, while the sales amounted to 843,281 tons, the company's own consumption being nearly 70,000 tons. The sales during the year had not been limited by the demand but by the output, as the economical value of coal, compared with the fuel used by the natives up till recently, had been brought home to the Chinese by the gradual introduction of coal into the markets. So great was the change in the situation that the general manager informs them that the demand for dust coal by the Chinese alone largely exceeds the present total output of the mines. As the important question was not primarily the increase of sales, but the increase of output, and as this was mainly a question of dealing with the water in the Tongshan and Linsi mines, tenders had been invited for a powerful electrical pumping plant and the erection of a central electric power tation at Tongshan.

Mr. Edmund Davis seconded the motion, which was agreed to unanimously.

The Chairman in replying to a vote of thanks expressed the indebtedness of the shareholders and the board to the agent and general manager (Major Nathan —who was assisted by an excellent staff —for the admirable manner in which the affairs of the company had been managed in China. The shareholders' thanks were due to him no less than to the board for the results which had been submitted.

MINERAL WEALTH OF SIAM

At this moment, says the *Siam Free Press*, when Siam is shaping out a program of general development and progress in creating new laws, introducing various reforms, important schemes of public works, including sanitary and water systems, irrigation schemes and the extension and development of agriculture, defining the laws of land tenure, lease holding, which until now has been a fruitful source of quibbling, it may be interesting to say a word in passing on the mineral wealth of Siam of which very little is known, but which is bound to become a fruitful source of revenue to the government later on. From time to time much surprise is expressed at the little attention that is paid to the exploitation and development of this vast source of wealth in Siam, and how is it that capitalists, until now, have done nothing towards this end?

There are several reasons why mining as an important industry in Siam has remained almost a dead letter. The principal cause may be attributed to the fact that the government hitherto has taken little trouble to exploit the mineral riches of the land, and invite capital to carry on the enterprise. In fact it is only very rarely the subject is ever touched upon, and then very little is said on the matter. The second reason is the great difficulties in the way of the would-be investor, in obtaining the necessary permission to prospect, and, afterwards, securing the concession; while the third reason is the poor facilities existing in the way of means of communication which largely account for the non-success of many branches of business, as well as the difficulty of securing manual labor. It is not for these reasons, however, that such vast sources of wealth should be abandoned. It lies with the government to remove some of the difficulties alluded to, and energy and enterprise will do the rest. We know of two mines which are being worked at present, and the prospects for rich returns are highly satisfactory.

In Siam, gold, silver, copper, tin, iron, and lead are found in rich deposits in many places. And the question has been frequently asked: Why does not the Mining Department arrange a proper geological map? Such a map would be of great value, and would convince capitalists of the vast subterranean treasures that still lie dormant awaiting the hand of energy and enterprise to turn them to account and add thus to the wealth and prosperity of the nation. Surely, the budget of Siam is large enough to permit of this study?

Several regions have already been prospected, and most valuable indications have been obtained at Lopburi, Tien Touk, Lom, Watana, Kabin, Ratburi, Bukanon, Korat, Punkio, and in several other districts in the peninsula and at Bang-ta-pan. In the region of Petriew-Pachim one part is known to be prospected only in some points which extend up to the great mountains of Chantaboon passing by Mong Panat. The natives of that place are working the alluvium, which work, however, is only found relatively productive. The gold is sometimes found in nuggets of four or five ticals weight. Tin is also found there, but the work of developing the industry has not yet reached the preliminary stages, only some holes having been made by the natives. Kabin is the oldest known mine in Siam, the working of which will again be undertaken on a larger scale than ever. Watana has large centers of rich strata. Sisophone is the great coming mine and already promises splendid results, from which the government is likely to derive great benefit when the railway from Bangkok to Pachim, Wattana, and Batambong, will be accomplished. The famous Khao Kampeng (Pnom Dong Reek) of Cambodia is very little known.

Coal also may be found in abundance, and taking everything into consideration, it is a matter of surprise that the Siamese Government, in its endeavors to find new sources of revenue, does not attempt enterprising works of research into such matters, from which large benefits would be sure to accrue which would greatly help in pushing forward sanitary irrigation and railway schemes. Why not favor a society having for its object the study of such questions, as well as those of quarrying and procuring limestone, etc.? If these things can be found in Siam there is no need to have them brought from other countries. Those numerous calcareous mountains, ignored until now, could be turned into a rich source of revenue for the country. Hydraulic limestone cement, etc., can be made here as elsewhere, and so can the iron mines be turned to account.

It is, therefore, greatly worth the while of the Siamese Government to take the trouble to show forth the richness of the soil in mineral wealth, as well as its fertility for agricultural purposes. Numerous societies have been formed in Bangkok during recent years the latest being an engineering society embracing all branches of the profession, having as members, electric, mechanic, hydraulic, irrigation, mining, and architectural engineers.

SUMATRA AND BORNEO TOBACCO

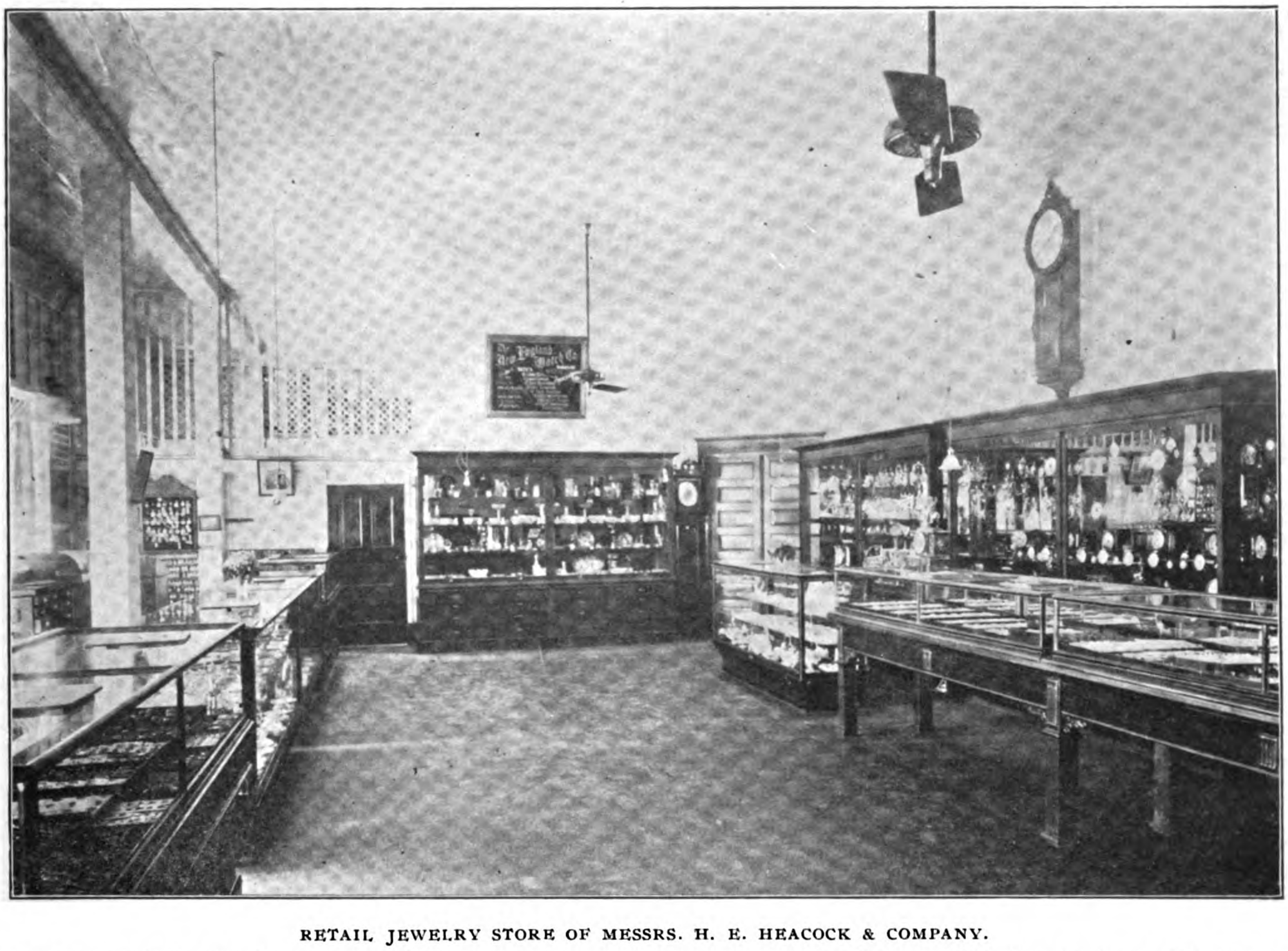
The final autumn sale of tobacco in Holland was recently held at Amsterdam. Fifteen thousand nine hundred and eighty-six bales of Sumatra and 2,638 bales of Borneo were offered for sale by tender. Considering the class of leaf offering, fair prices were realized from the Sumatra, though the Borneo lots did not attract much attention. Summing up the year's results, *The London and China Express* says that two leading facts at once stand out—a diminution of supply and an enhancement of prices. In the present year the Sumatra crop consisted of 233,957 bales, which realized an average price of 99 Dutch cts. a half-kilogram. In 1904 the crop was 254,168 bales and the price c.92. The present year's average is the best since 1901, when c.111½ was obtained for 223,731 bales. The general tendency with regard to supply and demand is for the latter to steadily increase, while the former is liable to violent fluctuations, in which weather conditions naturally play a leading part. At the moment, however, demand has undoubtedly overtaken supply, and the crop of 1905, just gathered in Sumatra which will come forward for sale next year, is reported to be 10,000 bales short of the crop just sold. In view of this, it is not surprising to find that a very firm tone has characterized the tobacco market of late, even though the leaf offering has not, taken throughout, been of good quality. Of really fine tobacco, suitable for the American market, there has even been a scarcity, and prices have ruled correspondingly high. Those estates which have yielded only medium and low-class leaf both years will probably be disastrous. This class of tobacco, it must be remembered, is, as the saying runs in Amsterdam, either "gold or iron." Amongst concerns marketing over 5,000 bales the company which has done best this year is the Amsterdam Deli Compagnie, which marketed 10,074 bales at an average of c.159. The United Lankat Plantations Company, Ltd., takes second place with c.134 for 9,189 bales, though 2 picked private estates obtained a higher average for comparatively small quantities. The Rotterdam Deli Maatschappij comes third with c.119 for 5,186 bales. The great Deli Maatschappij averaged c.108 for 53,508 bales, from 22 estates, the averages of which varied from c.65 to c.174.

The Borneo crop was a very poor one. The average is only c.62 for 16,615 bales, against c.80 for 17,043 bales last year. The New Darvel Bay Borneo Tobacco Plantations, Ltd., sold 3,686 bales. The New London Borneo Tobacco Company, Ltd., sold 8,668 bales at c.40, the New London and Amsterdam Borneo Tobacco Company, Ltd., 2,277 bales at c.44, and the Sapong Rubber and Tobacco Company, Ltd., 617 bales at c.34. The weather in Borneo severely handicapped planters, but the crop now in the sheds and coming forward next year enjoyed more favorable conditions.

MESSRS. H. E. HEACOCK & CO., JEWELERS OF MANILA, P. I.

The accompanying illustration gives a fine interior view of one of the most artistically arranged jewelry houses in the Far East. It shows the retail store of Messrs. H. E. Heacock & Co., which occupies spacious premises on the second floor of the McCullough building, in Manila, P. I.

The firm of H. E. Heacock & Co. came to Manila in the spring of 1901 and started in wholesale jewelry business as a branch of Messrs. Heacock & Freer, of San Francisco, Cal. Mr. H. E. Heacock started the business and Mr. C. F. Preusser came out and joined him in June, 1902. This year the firm has added a retail department to its establishment, and it is now doing a large and prosperous wholesale and retail business, dealing entirely in American goods and such articles as the firm manufactures in its own workshops. It also does a large watch and jewelry repair business.



RETAIL JEWELRY STORE OF MESSRS. H. E. HEACOCK & COMPANY.

Seven watchmakers and 6 manufacturing jewelers are employed in this establishment, which is equipped with a very complete workshop containing all the latest improved appliances for doing work, including gold, silver, and nickel plating.

H. E. Heacock & Co. carry a line of the very best goods that the American market affords. The leading firms they represent are the Keystone-Elgin Watch Company, the New England Watch Company, the International Silver Company, the Ostby and Barton Company, one of the largest manufacturers of gold rings in the world; the New Haven Clock Company, the American Cut Glass Company, and Messrs. Manning, Bowman & Co., manufacturers of nickel ware. In addition to the above they handle the lines of many other manufacturers whose goods are of the highest grade, and the most artistic design and workmanship. All goods sold by this firm are guaranteed.

HONGKONG LEADS IN SHIPPING.

A recent parliamentary blue book, published in London, gives various tables relating to the shipping of the world. Hongkong figures are exclusive of Chinese junks engaged in foreign trade, and yet, without them, Hongkong is rated as the first shipping port in the world. Following are the totals of entrances and clearances for some of the principal ports:—

Hongkong	19,204,889
London	18,639,159
Antwerp	18,139,184
New York	17,900,168
Hamburg	16,466,639
Liverpool	14,716,790
Rotterdam	13,597,819
Cardiff	13,119,472
Singapore	12,004,919
Marseilles	11,337,077
Monte Video	11,143,852
Genoa	10,098,753
Colombo	9,439,632
Lisbon	9,407,316
Tyne ports	8,882,156
Gibraltar	7,769,069
Malta	7,185,268
Capetown	7,165,185
Kobe	6,670,677
Melbourne	6,487,290
Shanghai	6,192,044
Sydney	5,934,411
Calcutta	3,032,326
Bombay	3,000,199

"A SIMPLE PUNCH CHUCK"

Before a recent meeting of the Engineering Society of Siam (Bangkok), Mr. J. W. Hinchley, A. R. S. M., Wh. Sc., read a paper on *A Simple Punch Chuck*, which was as follows:—

"The engineer of the East must approach all his problems in an entirely different spirit to that in which similar problems may be approached in the West. The unskilful character of the workmen, their lack of thought, and the entire absence of what is called conscienciousness in work makes it necessary for the engineer to be very careful in adopting new methods which call for these qualities on the part of the workmen; in fact the engineer has constantly to devise methods by which things, in the ordinary way will not go wrong, rather than methods by which some new result may be accomplished. The simple punch chuck I wish to describe illustrates these remarks. In punching from sheet metal large numbers of similar pieces it is usual to make the fittings or chucks for both punch and die immovable but on the same centre line so that if these parts are truly turned their alignment is certain. Unfortunately there are practically no workmen in the East who can be depended upon to make these parts accurately, and also to fix them in the machines truly; the simple punch here described is one by which the alignment and die is made certain when being fixed in the machine, however poor the character of the workmen."

Mr. Hinchley then described his punch chuck in detail by means of a drawing.

SULPHUR IN JAPAN

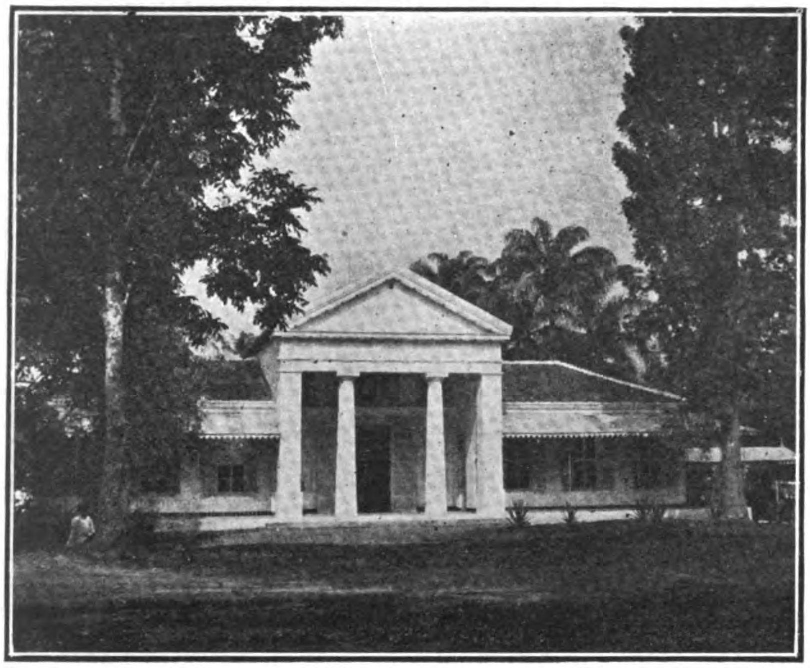
Sulphur is widely distributed in Japan, on account of the volcanic nature of the island, but is most actively mined in the north; it occurs generally in the vicinity of still active volcanoes. There are six principal mines, in order of importance: Imaonobori and Tsurugkisan in Hokkaido province, Skiranesan in Tochighi, and Yahukodoyama, Doro-in and Iwojima in Sahuma. The first two belong to the firm Mitsui Busan Kaisha, of Tokyo.

The country's output has grown from 10,000 tons in 1900 to above 20,000 tons in 1904, and is likely to grow still further. Domestic consumption takes only a quarter of the output, the consuming industries being the manufacture of matches, for which there are numerous plants, of explosives and of chemicals. As the price of sulphur advances, pyrite is being substituted, the supply of which comes mainly from Australia.

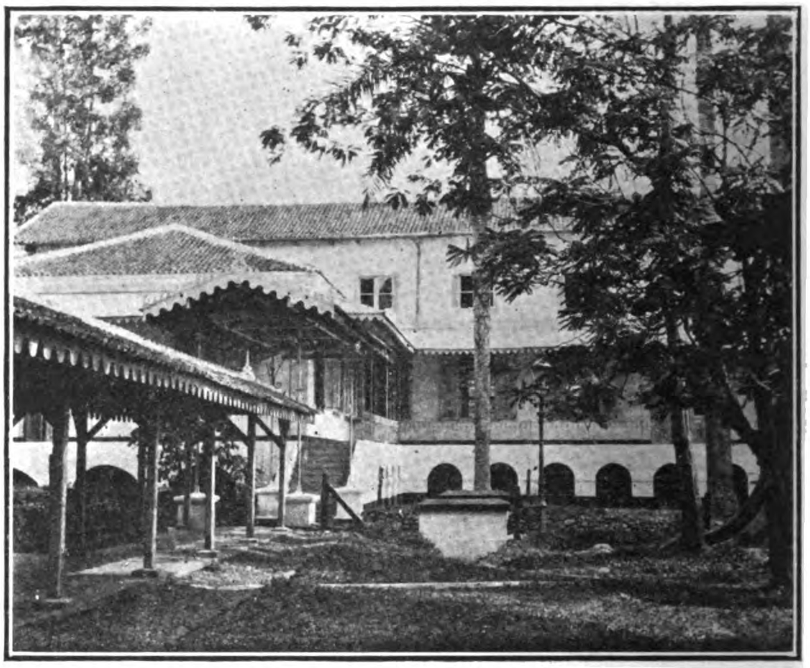
Exports amount to 14,000 or 15,000 tons per year, the W. coast of the United States and Australia being the largest consumers; Hakodate is the usual shipping port, although Kobe and Nagasaki ship small quantities to China.

In N. Japan, snow interrupts activities for five months in the year. The process of extraction is still primitive; the ore is put into iron receptacles and heated to 115° C. The Mitsui company, a few years ago, introduced modern Gill's furnaces such as are used in Sicily.

The yield of sulphur from Japanese ore is probably the highest in the world.



BOTANICAL MUSEUM.



BOTANICAL MUSEUM, REAR VIEW.

THE SCIENTIFIC EQUIPMENT OF THE BOTANICAL INSTITUTE, JAVA

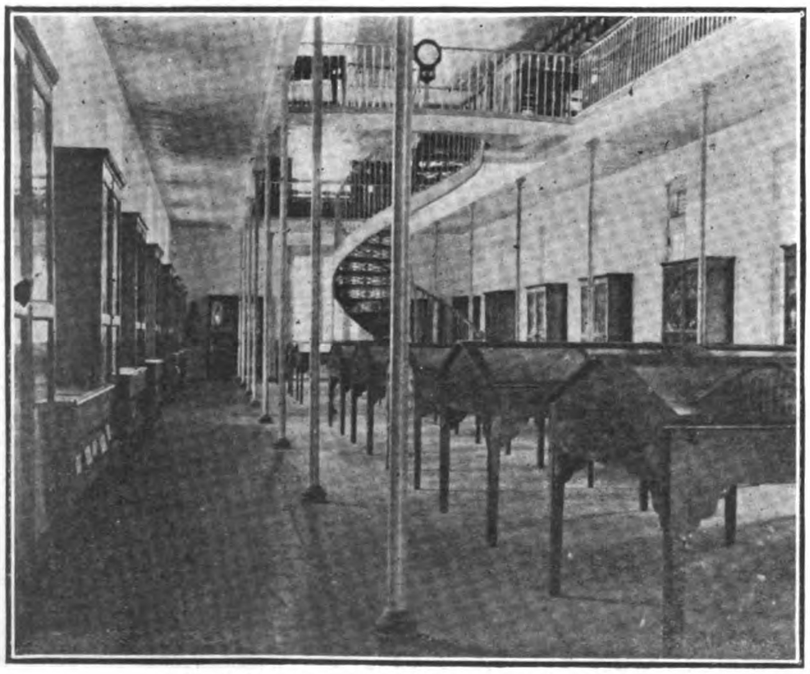
In connection with a report of Mr. Elmer D. Merrill, head of the Division of Botany of the Bureau of Forestry, Philippine Islands, made after an official visit to Java for a season of investigation there in the interest of the forest flora of this archipelago, appears a most interesting and instructive description of the Botanical Institute of the Department of Agriculture of Java. Mr. Merrill records some of the methods of investigation in vogue there and tells of the equipment of the Botanical Institute as he found it.

EQUIPMENT.—The present magnificent equipment and wide influence of the Department of Agriculture is due largely to the well-directed efforts of Dr. Treub, the director, a gentleman who is by education and inclination most admirably fitted for directing such an institution. At the time of his appointment in 1880 the institution practically corresponded to what is now the fifth division; for at that date that most practical adjunct, the experimental garden, had been established but 4 yrs. Since the year 1880 the institution has extended its field from almost pure botanical work, to investigations which at the present time cover all lines of tropical botany and agriculture. Thorough work is the watchword; and the success of the many investigations carried out at Buitenzorg have had great influence not only on the agricultural development of the Dutch East Indies, but throughout the tropics. The success of the investigations made at this institution is recognized by the Dutch Government, as is shown by the large appropriations made for its maintenance and for special investigations, construction of new buildings, etc. It is also interesting to note here the interest that the Dutch planters take in the institution; for the entire expense of certain investigations is borne not by the Government but by an association of planters. In 1890 there were but 4 laboratories; to-day there are 8, each with most modern equipment. The working staff of the institution at present numbers about 30 Europeans and more than 200 natives.

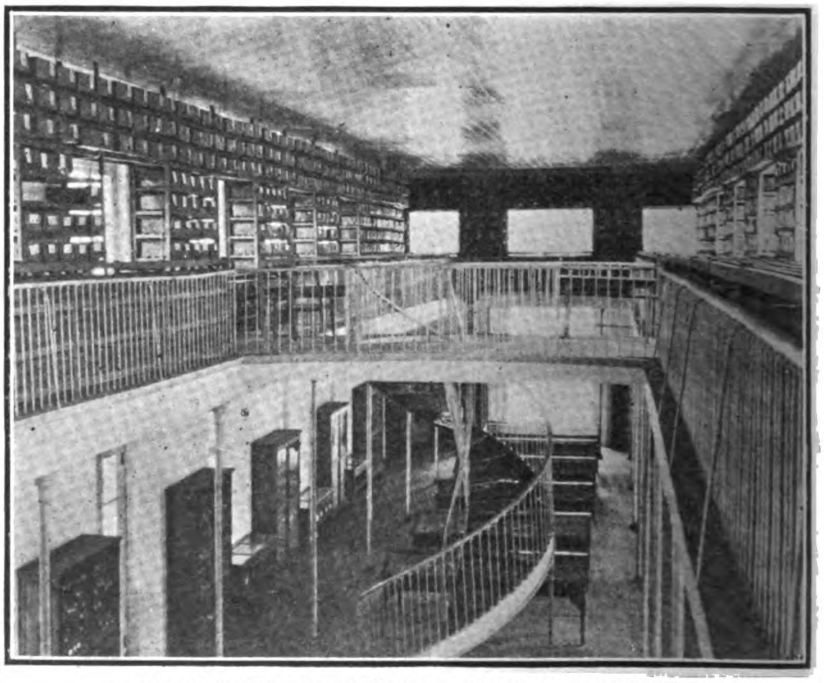
The Botanical Garden, from a climatic standpoint, is admirably situated, for under tropical conditions it is necessary, in order to have a successful garden, situated in a locality where the rainfall is distributed throughout the year instead of having the two well-marked seasons—wet and dry. At Buitenzorg this condition is fulfilled, for during the so-called dry season rains are frequent, while during the rainy season one can expect rain every day—always in the afternoon at about 4 or 5 o'clock. The average precipitation in a year is about 4,680 mm., while sometimes as much as 160 mm. will fall in 24 hrs.

The experimental garden consists of 180 acres, and is situated about 2 ms. from the Botanical Garden proper. The object of this garden is to grow species of economic importance on a large scale; to supply material for investigations made in the various laboratories; experiment with various methods of cultivation, treatment etc. Practically all the tropical plants of great economic importance are found here, each species being represented by a large number of specimens. The species cultivated include many varieties of coffee, tea, and cacao; abacá and other fiber plants; pepper, nutmegs, cloves and other spices; erythroxylon, cinchona, and other plants producing alkaloids; palms of economic importance; grasses yielding essential oils; numerous varieties of gutta-percha, caout-

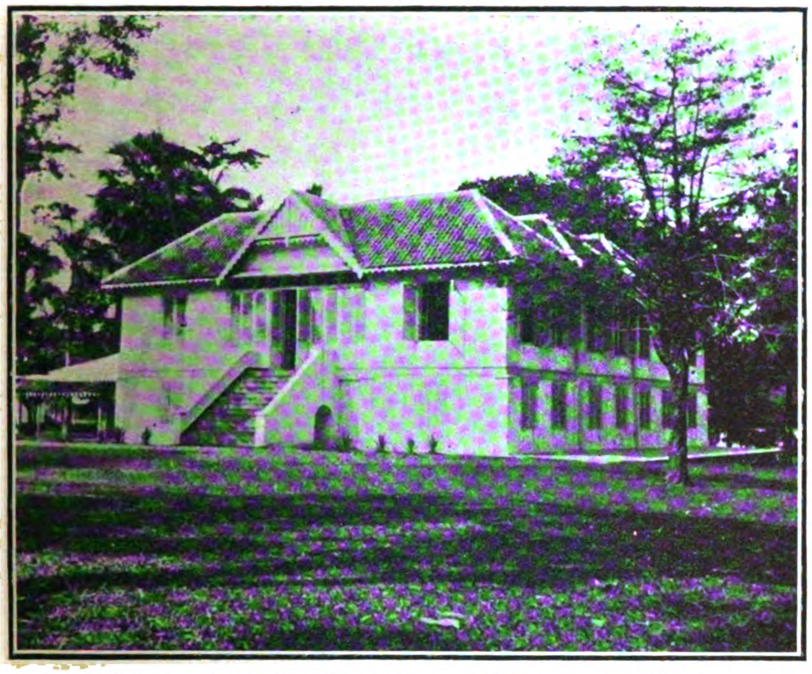
(Continued on page 184.)



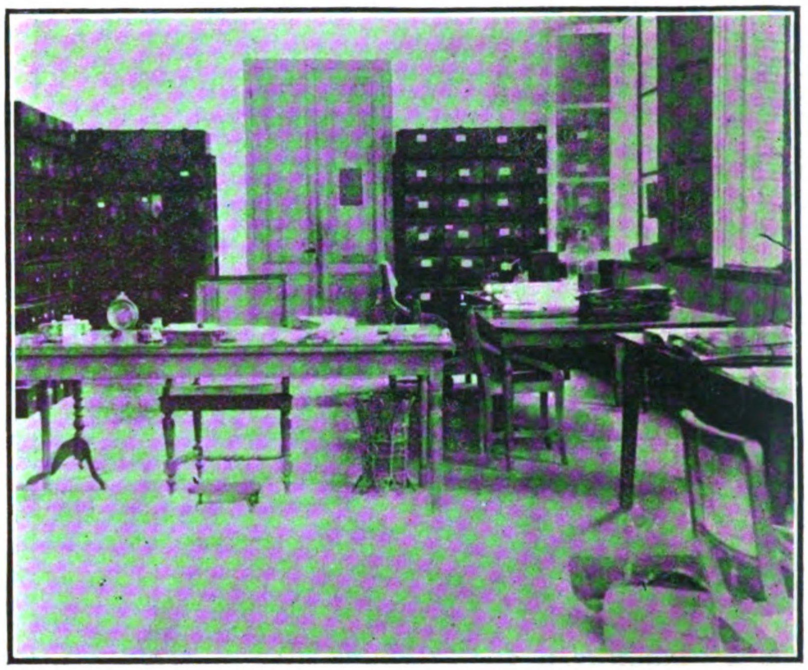
BOTANICAL MUSEUM, INTERIOR, MAIN FLOOR.



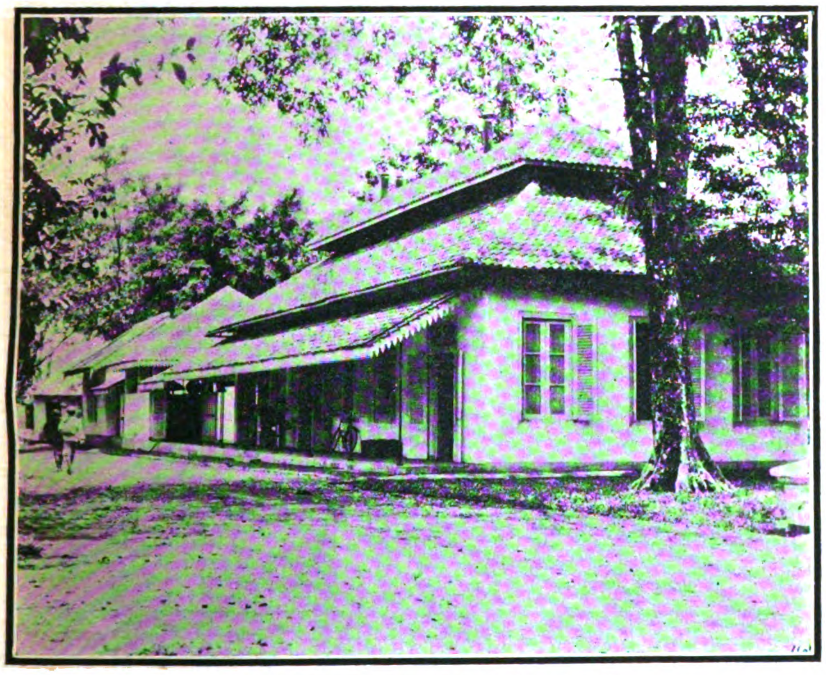
BOTANICAL MUSEUM, INTERIOR, FROM THE BALCONY.



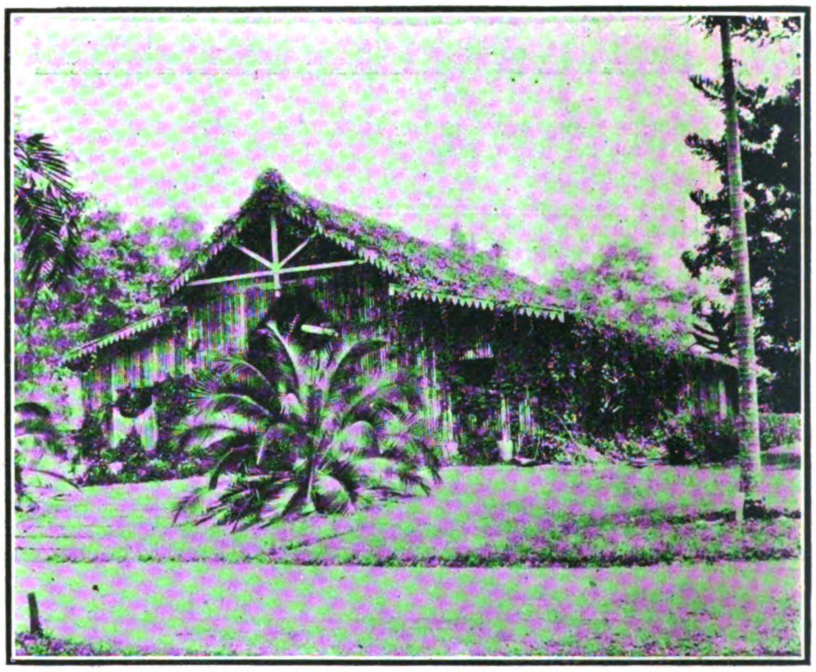
HERBARIUM BUILDING, FOREST FLORA INVESTIGATIONS.



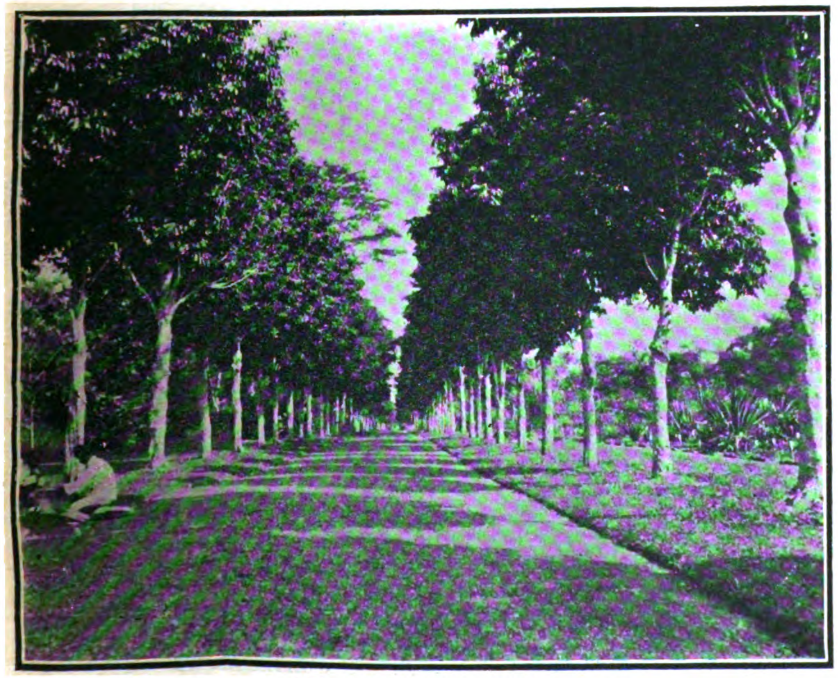
LABORATORY FOR SYSTEMATIC BOTANY, FOREST FLORA INVESTIGATIONS.



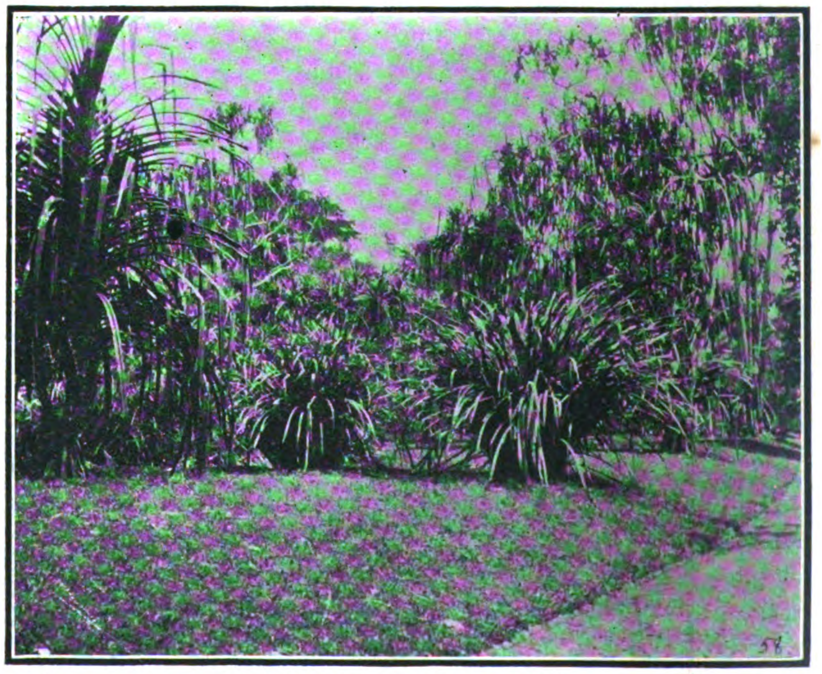
OFFICE OF THE EXPERIMENT GARDEN.



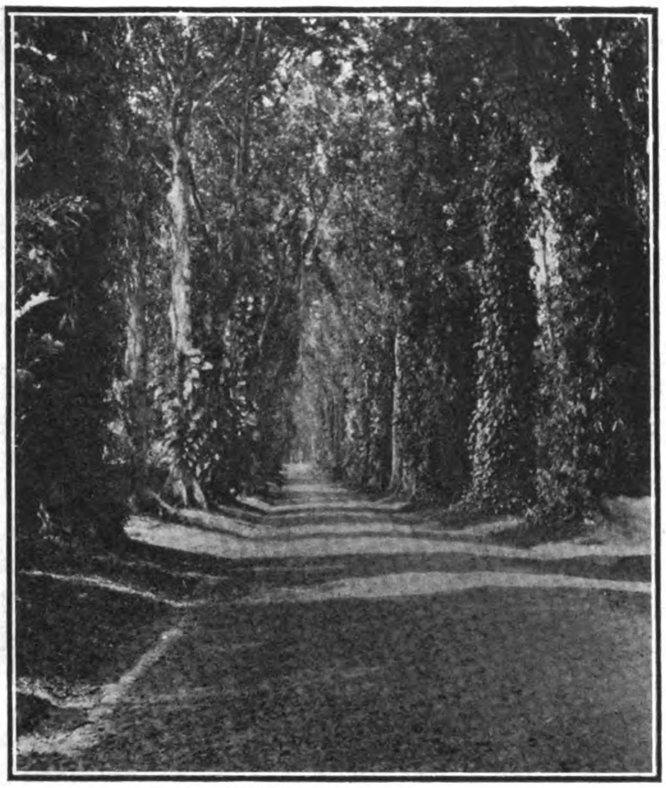
AROID HOUSE.



NEW CANARIUM AVENUE.



VIEW IN THE PANDANUS SECTION.



CANARIUM AVENUE.

A PALM AVENUE.

THE SCIENTIFIC EQUIPMENT OF THE BOTANICAL INSTITUTE, JAVA

(Continued from page 182.)

chouc, and other gum-producing trees; plants producing dyes, tannin, camphor, etc. Also connected with this garden is a large area of paddy land for experimenting in rice culture.

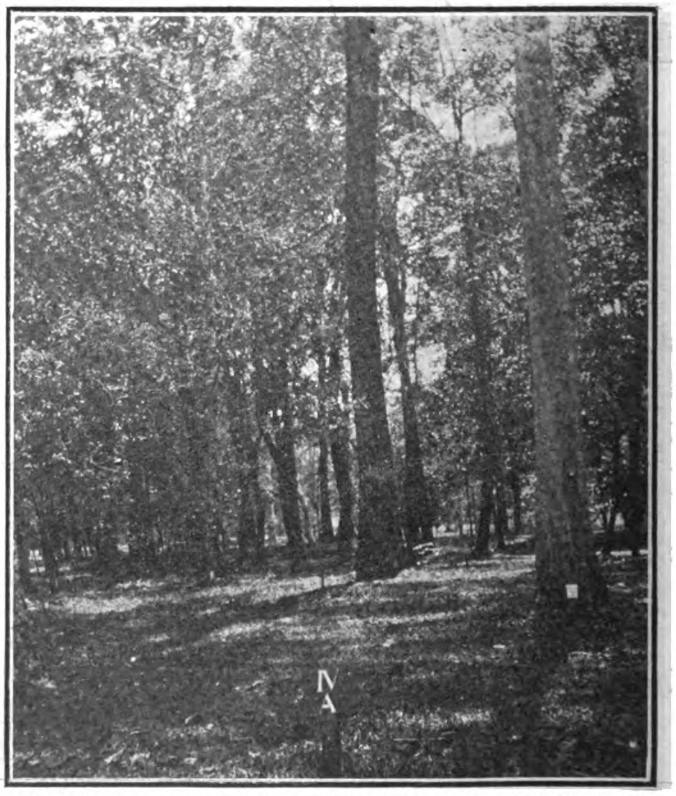
LABORATORIES.—For many years but one or two laboratories existed at Buitenzorg, and as late as 1890 there were but four; to-day the following laboratories exist, all with modern equipment: Agricultural chemistry, pharmacology, agricultural zoology, vegetable pathology and physiology, botanical laboratory reserved for foreign investigators for personal work, laboratory for the study of tea, laboratory for the study of rice, and laboratory at Tjiboda for the study of the virgin forest. At present a large building is in course of construction to be devoted to agricultural chemistry.

The herbarium, containing approximately 200,000 specimens, consists of the old or great herbarium, which is deposited in the botanical museum; the new, or forest flora herbarium, which occupies a separate building at the present time, but eventually will be combined with the great herbarium; the "garden herbarium," species cultivated in the laboratories for the use of foreign scientists; and the "Herbarium Borgoriense," a collection of the plants growing in the vicinity of Buitenzorg.

Primarily, the Department of Agriculture was a botanical garden pure and simple; and in its early history, although some attention was given to the introduction, cultivation, and dissemination of plants of economic value from other countries, its chief object was the study of systematic botany. As was the case with the many botanical gardens established by the English in the Tropics, this institution, as the flora of the country was worked up, gradually increased its work on economic lines, until to-day, although much attention is given to systematic botany, morphology, embryology, ecology, etc., the greater part of the work done is of an economic nature; the establishment, development, and maintenance of the botanical garden being simply a means to an end, namely, the application of science to the economic agricultural questions of the day.

EXPERIMENTAL STATIONS.—In the Island of Java there are 2 experiment stations for sugar; 1 in E. and the other in W. Java, and an experiment station for cacao; all of which are independent of the institution of Buitenzorg. The Forestry Bureau situated at Batavia and having charge of the government forests is also an independent institution, although all of the botanical work of that office is done at the department by Drs. Koorders and Valeton. These independent investigations form only a very small part of the total investigations now being carried out in Java.

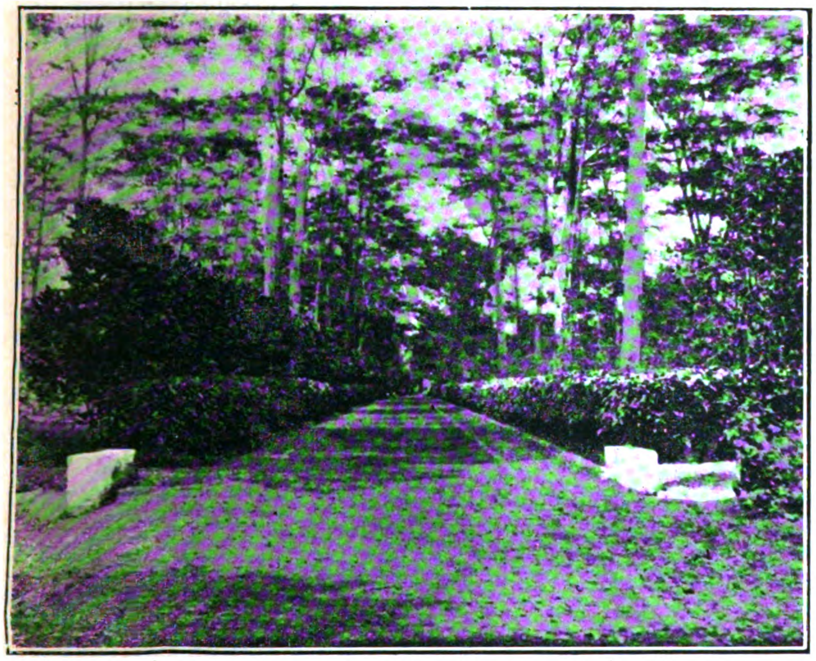
VIEW IN THE PALM SECTION.



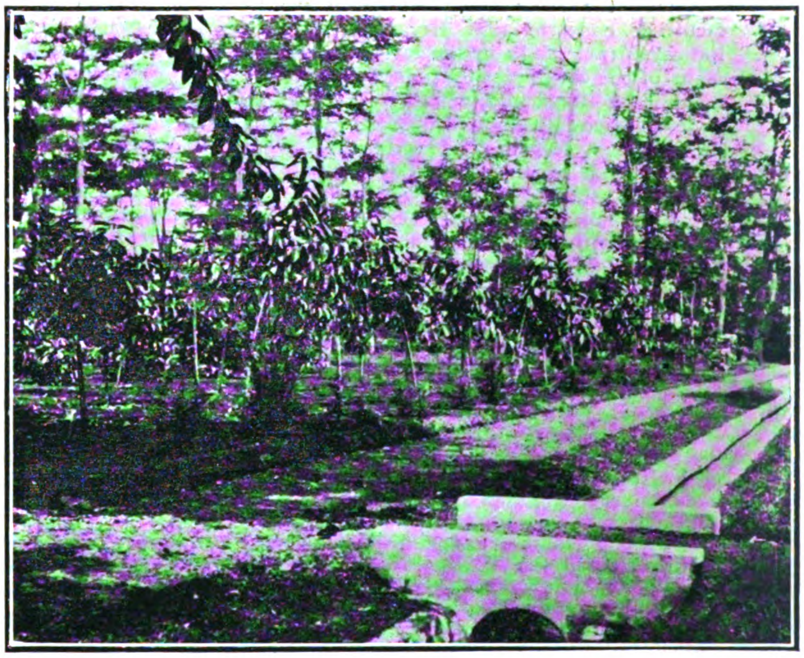
METHOD OF LABELING SECTIONS AND THICKNESS OF PLANTING.

RIVER IN THE GARDEN.

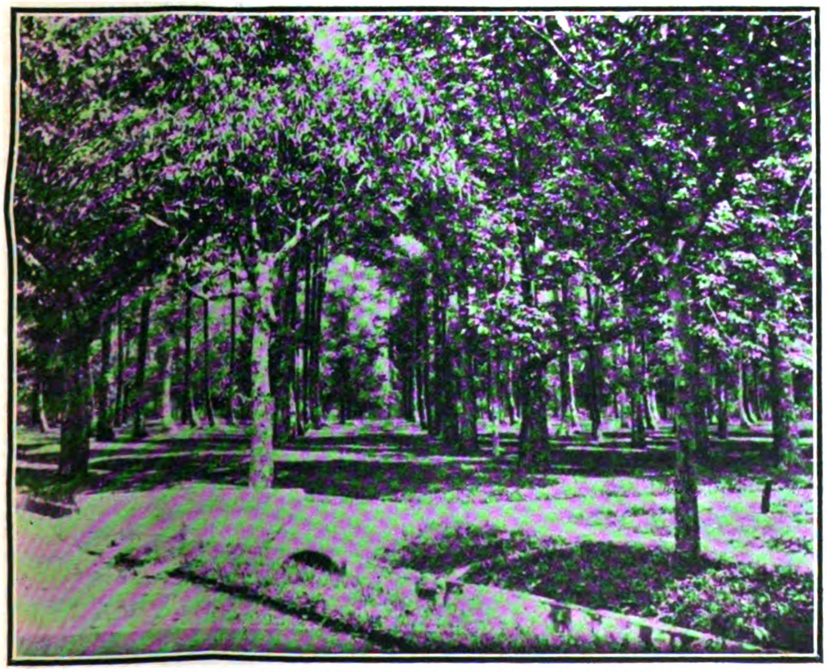
ANOTHER VIEW OF THE RIVER IN THE GARDEN.



MAIN DRIVEWAY IN THE EXPERIMENT GARDEN.



YOUNG RUBBER PLANTS IN THE EXPERIMENT GARDEN.



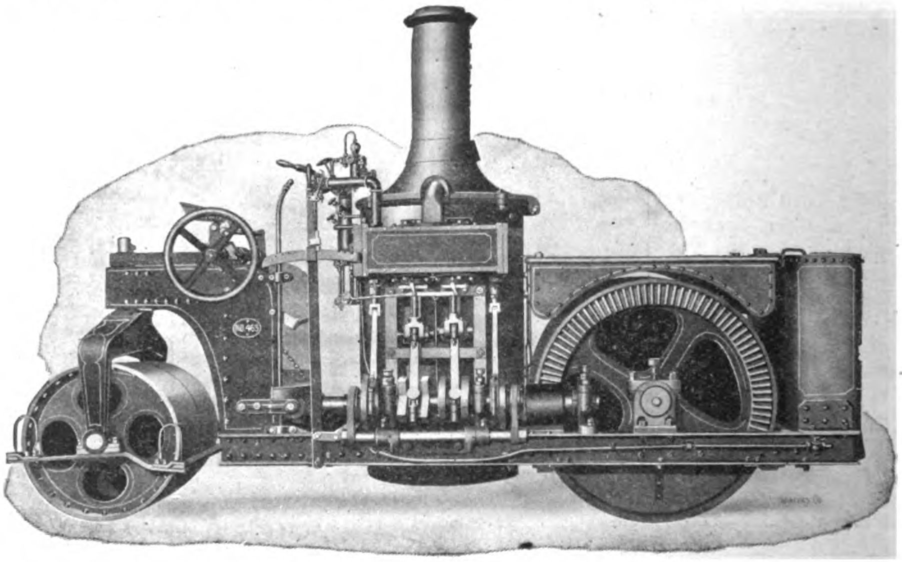
GUTTA-PERCHA TREES IN THE EXPERIMENT GARDEN.

SHOWING THICKNESS OF PLANTING IN THE EXPERIMENT GARDEN.

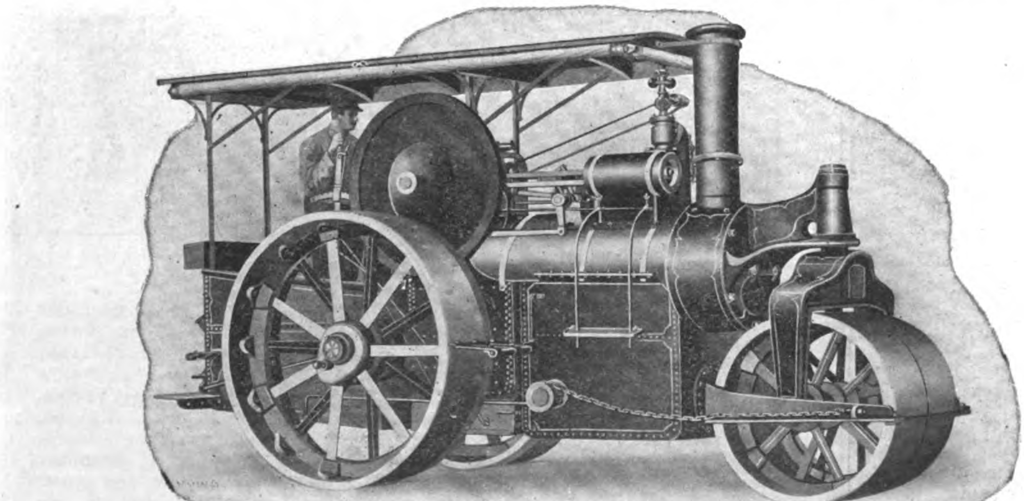
FAR EASTERN AGENCY OF THE KELLY SPRINGFIELD ROAD ROLLER COMPANY

TRACTION ENGINE DRAWING SIX 3-GANG DISC PLOWS, CUTTING STRIP 15 FT. WIDE.

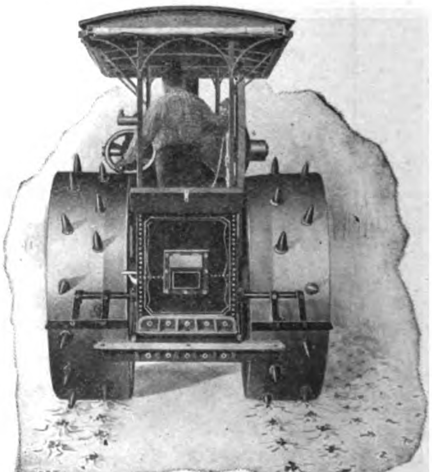
Among the enterprising American manufacturing concerns that have substantially indicated their faith in the internal development of the Philippine Islands, is The Kelly Springfield Road Roller Company, whose general offices are located at 151-167 Muelle de la Reina, Manila, and whose agency in the Far East is under the direct supervision of Mr. C. E. Helvie. The primary object which prompted The Kelly Springfield Road Roller Company to bring into the Orient its great line of industrial machinery and agricultural implements has been the promising conditions in the Philippines, where hacenderos, planters, and farmers are developing a rapid and surprising desire to supplant the antiquated method of agriculture with the modern methods of the Western World. When Mr. Helvie returned to America early last spring, after a number of months spent in a careful survey of the territory, he went back prepared to offer inducements to the company he represents to invade the Far East with their manufactures on a scale never before attempted by any concern doing business in this line in the Philippines. Acting on his advice, which was backed by good previous business in machinery, the company boxed up and shipped to Manila forty-five carloads of agricultural machinery of every description which could be utilized in tropical countries, with the result that today Mr. Helvie is receiving an immense amount of serviceable goods from the homeland. He has opened a large warehouse in Calle Principe, within a stone's throw of his offices, and is now busily engaged in setting up the machinery for the inspection of the general public. The object of The Kelly Springfield Road Roller Company in establishing its general Far Eastern offices in Manila was the central location of this city as a shipping point to other parts of the Orient. It is the aim of the company to invade the other countries of the Orient with their machinery and make a vigorous campaign for trade all along the line. The Kelly



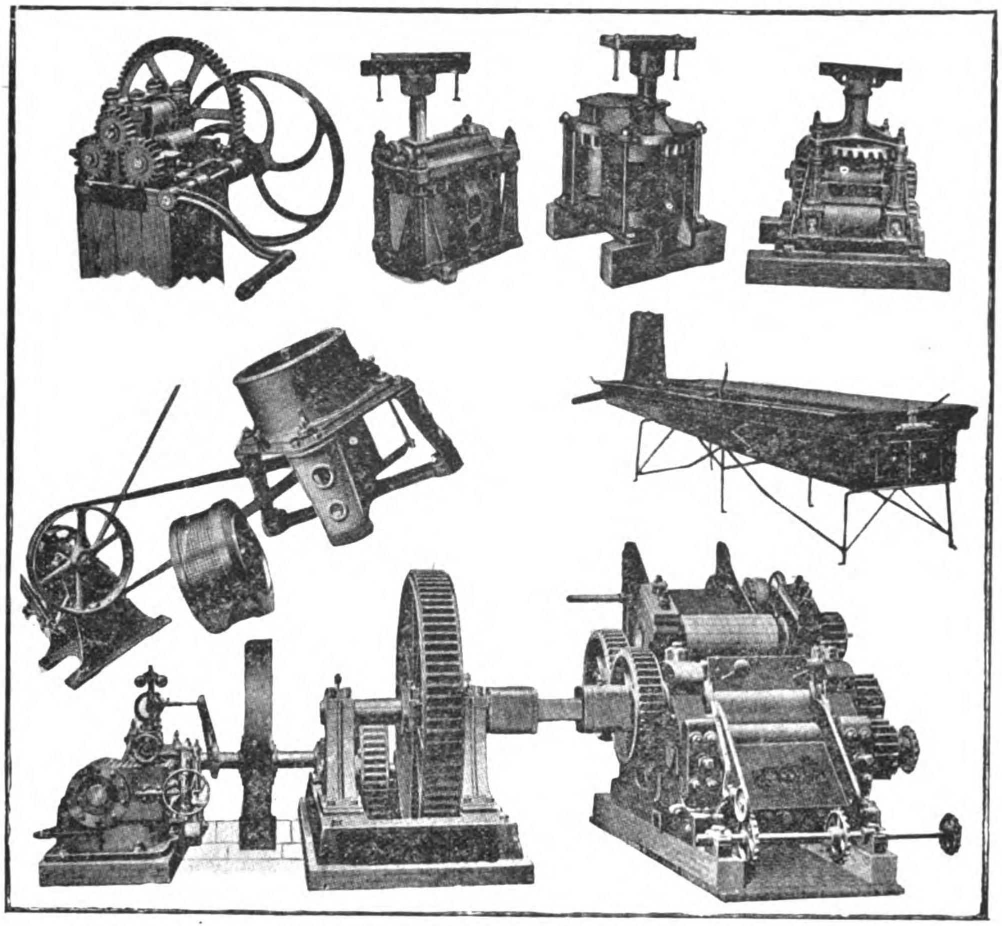
STEAM ROAD ROLLER, CAPACITY 10 TO 20 TONS.



STEAM ROAD ROLLER, CAPACITY 2½ TO 10 TONS.



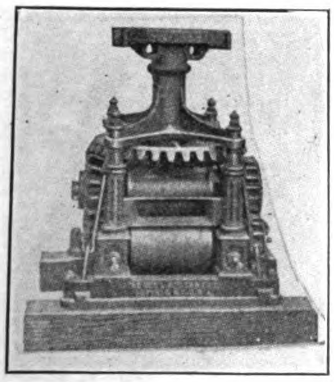
STEAM ROAD ROLLER, REAR VIEW.



MACHINERY FOR SUGAR PLANTATION.

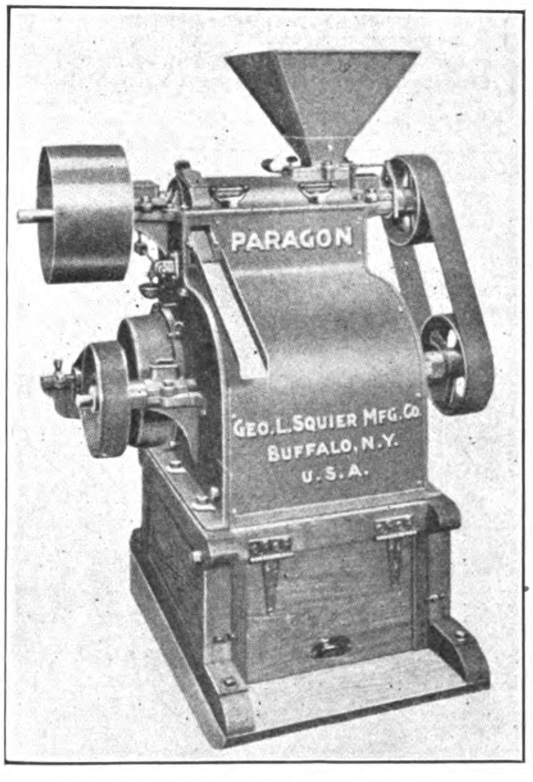
Springfield Road Roller Company is among the pioneer American manufacturers of agricultural machinery in the Philippines, and it has the reputation of liberal dealing in its line. Mr. Helvie has already sold much machinery to the native agriculturalists, in addition to large orders filled for the insular government. Besides agricultural machinery Mr. Helvie's agency handles machinery of every other description and for nearly every other purpose.

A LARGE VARIETY OF LINES.—Following is a partial list of machinery which Mr. Helvie's agency is prepared to supply promptly upon demand at prices which are moderate and within reach of all:—

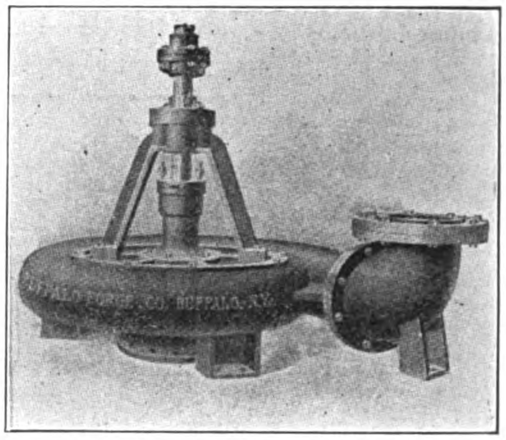


CANE MILL.

Windmills for irrigation; modern farm plants; small city waterworks; concrete mixers; tar tanks; Kelly cable plowing outfit; Kelly rubber tires and wheels; road building and maintaining machinery; rice threshing, hulling and polishing machinery; elevators, screens and bins; rock crushers of all sizes; tramways and cars; street sweepers and sprinklers; stone wagons; garbage carts; dump cars, track iron, switches and turning tables; wagon loaders, road builders and ditching machines; wheeled scrapers, tile ditchers and sewer builders; well machinery; hand sweepers for streets; hand garbage carts; windmills for farm purposes; spring drays; steam pumps; farm carts; railroad carts; carabao cart wheels and carts complete; all sizes of locomotives for plantations, custom houses, public works; large locomotives for railroads; rock drills; coal cutters; stone channeling machines; complete mining, tunneling and quarrying plants; forges; blowers; drills; all kinds of tools; derricks of all kinds for harbor improvements, custom house docks, buildings, railway and bridge construction; threshing machines; stationary engines and boilers; refrigerating and ice-making plants; sugar machinery of every description; coal and wood-burning traction and portable engines; straw-burning traction and portable engines; bean and pea threshers and cleaners, horse-powers; steam plowing engines; road locomotives for hauling freight; heavy cars for hauling logs, ore, or stone; cultivators and planters; separators, etc.

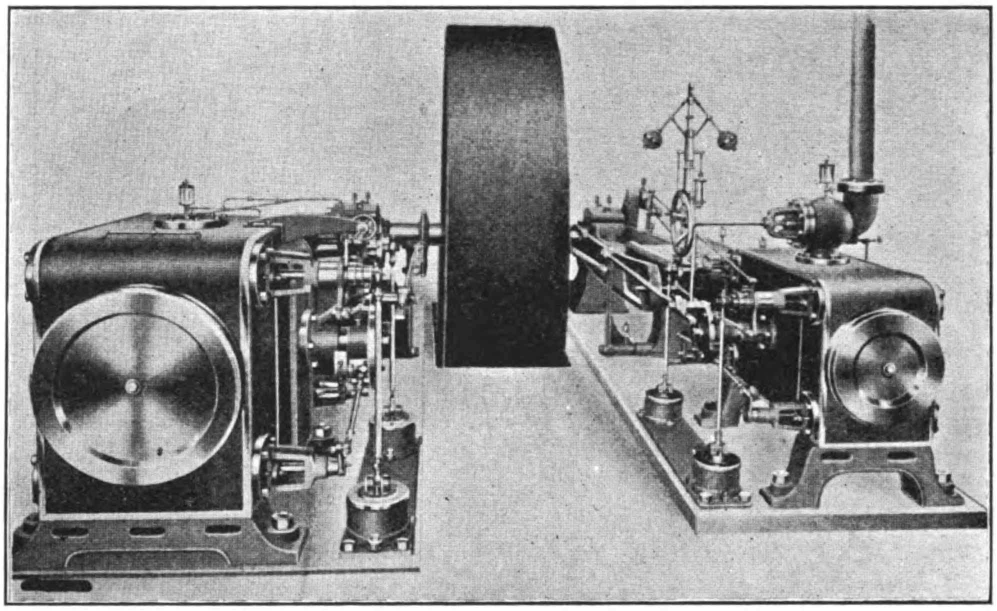


RICE HULLER AND POLISHER.



CENTRIFUGAL PUMP.

SPECIALTIES IN MACHINERY.—Mr. Helvie's agency is making a specialty of steam plows, traction engines, sugar and rice machinery, windmills and other plantation machinery in the Philippines. He was the first person to introduce the steam plow to the Filipinos, and it has met with such uniform success everywhere it has been tried that it promises to find general popularity among the great hacenderos, planters, and farmers of the Islands. Experiments with the steam plow were first made by the insular government



CROSS COMPOUND ENGINE WITH GIRDER FRAMES.

under the Chief of the Bureau of Agriculture, and they attracted widespread attention. The government started the demand for them by purchasing several for the agricultural farms which have been established throughout the Islands, and then came the demand from private individuals.

Other machinery suitable for working up large tracts of land and handling their cultivated products followed close in the wake of the steam plow, and a surprising but most satisfactory and encouraging fact develops that the Filipinos are not only alive to the necessity of improved methods in agriculture, but that they are taking enthusiastically and with noticeable aptitude to improved machinery.

THE WINDMILL.—There seems to be little doubt but that the introduction of the windmill into the agricultural field of the Far East is an important part of agricultural progress. Owing to the air currents of the tropics and other conditions of the elements which, when utilized as a power by means of windmill transmission, is reliable and satisfactory. As an economical power there is no expense, practically, after the first cost—the purchase and erection of the mill. The capacities of windmills are based on a wind velocity of 15 ms. per hr., as this velocity is reached in all communities frequently. These capacities are calculated from practical results, and the mills which Mr. Helvie handles have been prepared after many experiments, with a view to the best daily results.

Irrigation windmills are of great importance in the tropics, and the question of a cheap but good irrigating plan is a great problem which Mr. Helvie's windmill irrigating system has solved. It is necessary to have a good steel windmill on a substantial tower operating a first-class pump of great capacity, and all of this the agency of The Kelly Springfield Road Roller Company can guarantee.

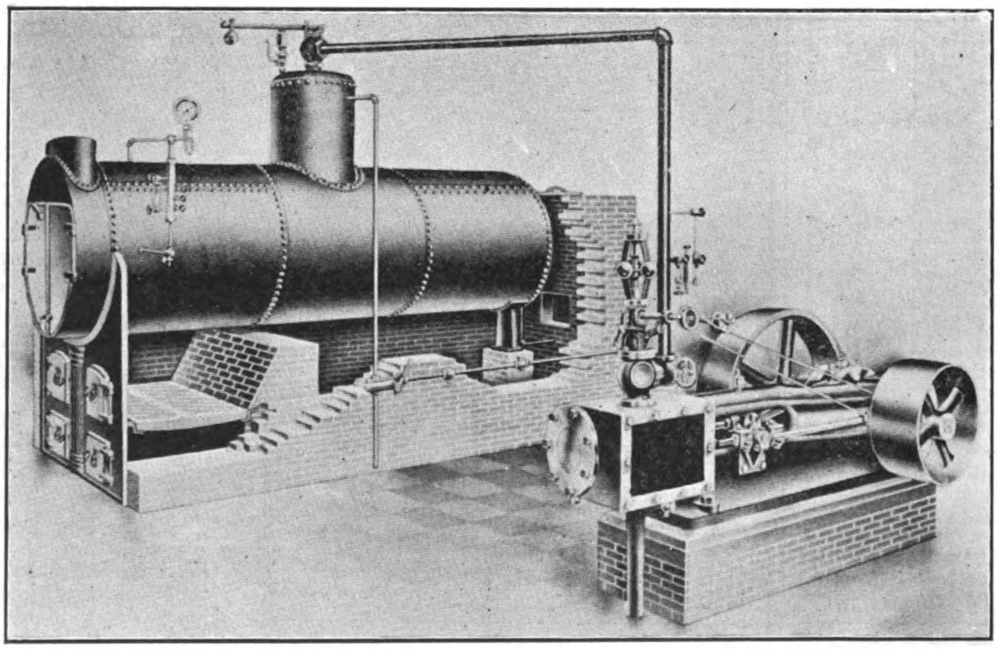
THE CORLISS ENGINE.—This famous engine as a power-distributer is a leading piece of machinery in the world's market today, and Mr. Helvie is prepared to supply it in any size.

ICE-MAKING AND REFRIGERATING MACHINERY.—Mr. Helvie is prepared to furnish this machinery in any capacity from ¼ to 200 tons, and for service in moderate-sized cities and towns he can supply exactly what is needed. There are many provincial cities of the Philippines which, if they possessed ice-making and refrigerating plant, would support them well.

RICE MACHINERY.—An accompanying illustration shows a new form of rice huller and polisher which is sold by The Kelly Springfield Road Roller Company's agency in the Orient. It is claimed for the machine that it not only hulls the rice, but at the same time gives it a fair amount of polish, and has the additional advantage of being equipped with a fan attachment which removes all the chaff.

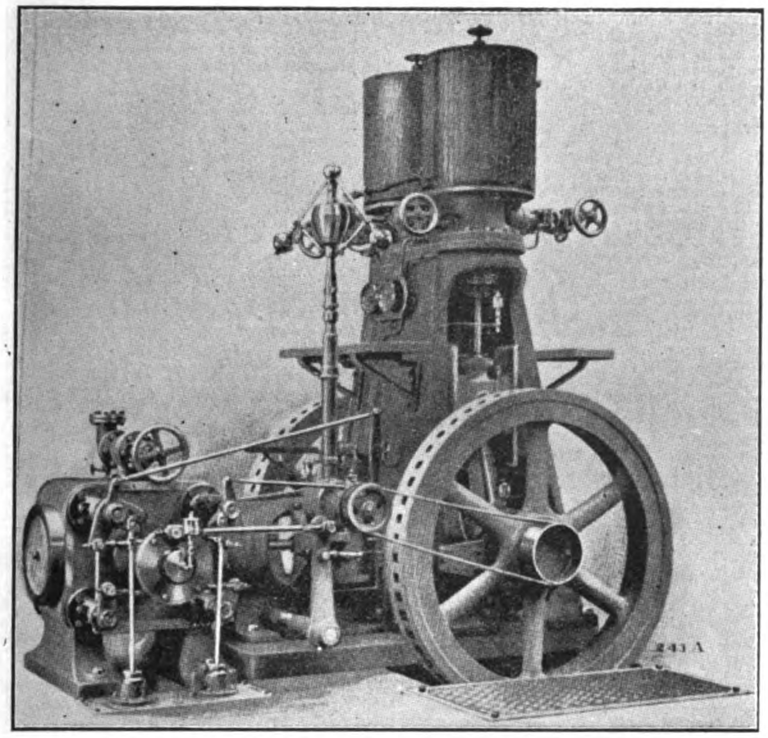
The working parts of the machine are made of iron and steel, and the grinding surfaces are of a specially prepared grade of hard steel. The lower concaves are hinged in such a way that the interior of the machine may be easily examined at any time. The machine is so arranged that by the removal of a small screen it can be converted into a very efficient coffee huller. When it is arranged as a coffee huller, however, the product does not pass through the polisher, but is passed through the auxiliary gate. This auxiliary gate is so arranged that a sample of the work being done by the huller may be obtained at any time.

The machine is rigidly built throughout and is designed to endure hard and conti-



STATIONARY ENGINE AND TUBULAR BOILER, SHOWING HALF ARCH FRONT SETTING.

nuous use. It weighs about 900 lbs. set up and will hull and clean about 6,000 lbs. of rice in 12 hrs.



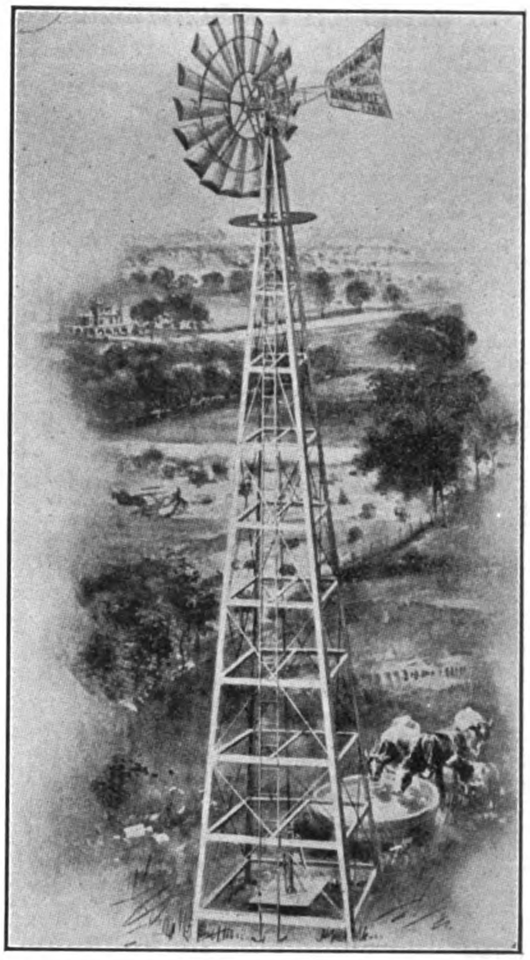
ICE-MAKING AND REFRIGERATING PLANT.

From 6 to 9 h. p. is required to operate the machine, and the floor-space occupied is 36 by 40 ins.

The hopper is made of steel and is large and deep, containing on the inside an agitator which prevents clogging.

The hull cylinder is 5 ins. in diameter, 17⅝ ins. long and operates at the rate of 500 r. p. m.

The chaff fan has a 9-in. blast wheel and an outlet 4 3/16 ins.



GALVANIZED STEEL BACK-GEARED WINDMILL AND GALVANIZED STEEL TOWER.

Oriental Construction Co

C. W. MEAD, C. E.
President and Shanghai Manager.

N. M. HOLMES, C. E.
Vice-President and Hongkong Manager.

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FAR EASTERN ENGINEERING, CONSTRUCTION COMMERCIAL AND FINANCIAL, NEWS

PERSONAL.

TS'AI NAIHUANG, a Szechuan *taotai*, has been appointed adviser to the *Shangpu*, or Chinese Board of Commerce.

MESSRS. ARNHOLD, KARBERG & CO. have been appointed local agents of the Russo-Chinese Bank, at Newchwang, Manchuria.

MR. CHARLES S. LEAVENWORTH, the newly appointed deputy and vice-American consul at Nagasaki, has assumed his official duties.

MR. WILBUR T. GRACEY, once in charge of the American consulate at Foochow and latterly that at Nanking, has been appointed vice-consul at Hongkong.

MR ROGER S. GREENE, American vice-consul at Kobe has been appointed commercial agent at Vladivostok, succeeding Mr. R. T. Greener. The post is equivalent to a consulate, the Russian Government not allowing consuls at this Siberian port.

MR. J. H. WALLACE, chief engineer of maintenance of way of the Southern Pacific Railway, who was investigating the railway possibilities of the Philippines in the Harriman interests, has now gone to Korea and Manchuria as a sequel to Mr. Harriman's recent visit to those countries.

TAOTAI JFME TIEN-YOU, a graduate of Yale University, Sheffield Scientific Department, A. M. I. C. E., London, and superintending engineer of the Peking-Changchaikou (Kalgan) Railway, now in course of construction, has been appointed by the Chinese Board of Commerce as special adviser on railway matters to that board.

MR. DE RIJKE, a well-known civil engineer, has accepted an invitation from the Chinese Government to come out to the Orient from Europe and take charge of the Whangpu conservancy operations at Shanghai, for the improvement of the Whangpu River and Woosung Bar. It is understood that the Chinese Government has promised to appoint a French and a Japanese civil engineer to assist Mr. de Rijke.

MR. HAMILTON WRIGHT, special commissioner for the United States Commercial Museum in the Orient, has arrived in the Far East and is at present making an extensive tour of the Philippine Islands. He will make a report of the agricultural condition of the Philippines and furnish newspaper articles to a syndicate of American papers and magazines. He is authorized to gather such information and data, statistics and exhibits as will assist in bringing about closer relations between the Orient and the Pacific Coast of America. The exhibits will all be shipped to the Pacific Commercial Museum with the accompanying data, so that any merchant and manufacturer may see what goods are consumed in the Islands and what they are sold at and exactly how they are put up for customers here, as well as other valuable information. He will also visit China, Japan, Java, Sumatra, and the Straits Settlements with the same object in view.

RAILWAYS, SUPPLIES, ETC.

SOOCHOW-HANGCHOW-NINGPO RAILWAY, CHINA.—It is announced that the Peking Government has asked the British minister to fix a date for the cancelling of the Soochow-Hangchow-Ningpo Railway concession.

ROYAL RAILWAYS, SIAM.—The construction of the Petriew branch of the Royal Siamese Railways, officially known as the "Eastern Line," has been commenced.

PEKING-KALGAN LINE.—The chief engineer of this railway has assessed the cost of construction at Tls. 7,291,800, and this has been reported to the Peking authorities for approval.

PROJECTED CHENGTEFU-PEKING RAILWAY.—The Military Governor of Ye-he, Sungshou, is having a survey made of a proposed railway from Chengtefu to Peking. There are rich repositories of gold and silver in this district.

ANNAM RAILWAY EXTENSION.—It is reported that the Chinese Government has granted a French concession for the extension of the Annam Railway to the Yunnan boundary, and that construction is to begin immediately.

SINTEHFU-PEKING ROUTE.—The commandant of Iho is making a survey of the route from Sintehfu to Peking. This is at present an important trade route, and, owing to the mineral wealth in its vicinity, he is of opinion that the construction of this railway should be proceeded with at once.

TRUNK RAILWAY FOR CHINA.—According to London advices the Chinese Government is planning the construction of a trunk railway which shall traverse the 8 central provinces of the empire, and shall connect Canton with Peking The Canton-to-Hankow Railway form the S. part of the line.

FRENCH AND CHINA RAILWAYS—It is reported that the French minister at Peking is urging the Chinese Government to grant to French subjects railway concessions at least to the extent that they have already been granted to British subjects. The viceroy at Canton is opposed to the present scheme for the Canton-Kuangchouwan Railway, which is partly a foreign enterprise. The French concessionaries are taking steps to safeguard their interests.

SHANGHAI-NANKING RAILWAY.—The first 12 ms. of the Shanghai-Nanking Railway, from Woosung to Naziang, have been formally opened to traffic. Grading on this section was begun about 1 yr. ago. It is single-tracked, nearly straight, and has only one small bridge and a few culverts which have made it very easy of construction. The cost must have been moderate, although the Chinese charge this company with gross extravagances.

PEKING-HANKOW RAILWAY.—The journey from Peking to Hankow over the railway which has just been completed takes 36 hrs. This line heretofore known as the "Lu-Han (Lu-know-ch'iao, referring to the classic bridge of Marco Polo, about 15 ms. SW. of Peking, the "Han" standing for Hankow) will from now be called "Ching-Han" Railway ("Ching" meaning capital). The total cost of construction has been Tls. 50,000,000.

HSINMINTUN-MUKDEN RAILWAY —The Tartar General of Mukden and Governor-General of Fengtien Province, has lately been in constant telegraphic communication with the Board of Foreign Affairs at Peking, with reference to the projected extension of the railway from the town of Hsinmintun towards Mukden, work on which was interrupted by the war. He has informed the board that work on the extension should be resumed immediately.

CHINESE EASTERN RAILWAY, MANCHURIA.—The length of the Chinese Eastern Railway from Changchung to Port Arthur, which has been acquired by Japan, is over 300 ms., and the working expenditure of this section amounts to Y-220,000 per mo , maintenance-costing-Y-15 per m. per day. At present, says the *Jiji* it is very difficult to obtain a revenue of only-Y-120,000 per mo., and by working the railway the Japanese Gorvernment, at present, will lose at least-Y-100,000 per mo.

SHANTUNG RAILWAY.—The offices and line of the Shantung Railway have been handed over to the Chinese. This line—from Tsingtao to Chinan, the provincial capital of Shantung—was completed by the Germans in 1908, and several trains a day are now running over the stretch of about 250 ms Its earning capacity quickly showed excellent results, both as regards freight and passengers, and it is estimated that it will shortly supply Weishien, Chouts'un and Chinan, the largest 3 trading centers in the province, with something like $5,000 000 worth of foreign freight *per annum* The Chinese Government has already opened these 3 places to international trade, and, in the near future, the railway ought to absorb the whole trade of central and N. Shantung-provided, of course, as the *Hongkong Telegraph* explains, rates are kept lower than water transport rates from Chefoo.

BRITISH AND CHINESE CORPORATION.—Commenting on the present agitation for Chinese control of the railways of the empire, the *Nanfangpao*, a prominent Chinese newspaper, says:—"The British and Chinese Corporation has not violated any of the provisions of the agreement as in the case of the American-China Development Company, and so it is difficult to take action on this score with a view to restoring the railway concession to the Kiangsu people. The energy of the agitators, therefore, is now directed to the early redemption of the railway. In regard to this, we wish to point out that the agreement gives China the right to redeem the bonds at 102½ after 12 yrs. and at par after 25 yrs Provided they have the necessary funds—which so far they have no knowledge how to raise, for the railway cannot be expected to pay off itself within so short a time—for the redemption of the bonds and net profits debentures after 12½ yrs., they can have the control and management of the railway back in their hands without any trouble. We sincerely hope, therefore, that the agitators will study the question thoroughly and not be simply led by blind patriotism without knowing what they are doing. Wild and eccentric statements or actions can only injure their cause. Striving for the restoration of the railways is laudable, but it is more important they should at the some time bend their attention to the raising of capital for the continuance and development of the work."

ELECTRIC LIGHTING, TRACTION POWER, ETC.

STEAMSHIP INSTALLATION, SINGAPORE —Messrs. Riley, Hargreaves & Co., Ltd., Singapore, have the contract for the electric lighting of the Straits Steamship Company's vessel *Sappho*, including the supply of the generating plant, electric fans, etc.

BANGKOK TRAMWAYS.—The exact length of the Siamese Tramway Company's lines, Bangkok, is 20-661 killometers, and the total cost has been Tcs. 1,530,000, or Tcs. 71,052.5 per killometer, which compares very favorably with the usual cost of construction elsewhere.

CENTRAL TELEPHONE BUILDING, MANILA.—The building which is to be constructed for the new telephone central in Manila, on the plot of ground recently leased from the government by the telephone people, will be built by the Atlantic, Gulf and Pacific Company. The building will be a 2-story construction of steel and cement and will cost $12,800 The only other bidder for the contract was The B. W. Cadwallader Company of Manila.

NEW TELEPHONE SYSTEM, MANILA.—The Philippine Islands Telephone and Telegraph Company has commenced the construction of its telephone system in Manila. The contracting concern is the Manila Construction Company of which Mr. H. Thurber is manager. It is understood that all the underground conduit work will first be constructed, and already this is being pushed with rapidity along the Bagumbayan Drive. The site for the central station is also being cleared. It is necessary here to raze a substantial building that has been standing there for years to make place for the modern concrete and steel structure which will house the operating appliances and general offices of the telephone company.

MESSRS. ARNHOLD, KARBERG & CO.—In a recent issue of THE FAR EASTERN REVIEW—the October number—this paper was made to say that Messrs. Arnhold Karberg & Co., whose commercial enterprise cover the most important trade centers of China, are agents for the Marconi system of wireless telegraphy. This was an error. The firm represents the Wireless Telegraphic Company of Berlin (System Telefunken), which it claims to be far ahead of the Marconi system. THE REVIEW takes pleasure in setting this slight inaccuracy right in justice to the business interests of Messrs. Arnhold, Karberg & Co.

DIRECT CABLE TO JAPAN.—The Commercial Pacific Cable Company, through its president, Clarence H. Mackay, announces that it has secured the necessary conces-ions to enter Yokohama, Japan, and Shanghai, China. M. Takahira, the Japanese minister to the United States, has affixed his signature to Japan's agreement with the Commercial Pacific Cable Company for landing rights at Yokohama. An agreement for landing rights at Shanghai was signed by China several weeks ago. The cable connections with both Japan and China will be made by extending the present lines of the company, which run from San Francisco through the stations at Honolulu and Guam to Manila. Japan will be reached by laying a cable from Guam in the Pacific Ocean direct to Yokohama. The cable to China will be laid from Manila to Shanghai. Mr. Mackay says the company will proceed at once with the manufacture and laying of these two cables, which will take several mos. The Commercial Pacific Cable Company will then pierce the Far East at three points, namely, the Philippines, China, and Japan. With the cable which has just been completed to Newfoundland, plus a fifth cable to Europe, and the cable from Guam to Japan, and one from Manila to Shanghai, the company will have a system extending over two-thirds of the way around the globe.

WATERWORKS AND IRRIGATION

WATERWORKS, MOJI, JAPAN.—Waterworks to cost $510,000 are to be constructed at Moji.

WATERWORKS AT CANTON, CHINA.—The construction of the waterworks system for Canton has just been commenced. Three engineers from Shanghai are in charge of the work.

HONGKONG WATER SUPPLY.—The control of the Hongkong water supply by the "rider" main system is being rapidly pushed ahead. Another extensive area in the W. part of the city is now being operated by the system.

GRAVITY WATER SUPPLY, MANILA, P. I.—Mr. J. F. Case, M. Am. Soc. C. E., Chief Engineer, Department of Sewer and Waterworks Construction, Manila, reports that the construction of the new wagon road, along the line of the pipe line and conduit of the gravity water supply is practically finished. About 800 men were employed on the work, which was done by day labor. In the gorge below the site of the new dam the road required some heavy rock work, but this was completed about December 10th. This opened the road throughout its entire length.

CANTON'S WATER SUPPLY.—The Canton (China) correspondent of a Shanghai paper says:—"Taotais Chu and Chan have been appointed to represent the government in looking after the interests in the Canton waterworks, and His Excellency Chang Yat Shi will represent the other shareholders. It is reported that a foreign firm approached the Board of Commerce recently, submitting a scheme and other regulations and expressing a desire to put in some capital. The firm, it is reported, was prepared to subscribe $1,000,000 or $500,000, whichever amount suited the Chinese shareholders. The Board of Commerce replied that as sufficient money could be obtained from the Chinese it was not necessary to borrow from foreigners. The firm also recommended several engineers for the works to which the board replied that the viceroy already wired to a certain engineer at Shanghai and that the gentleman was expected in a day or two. The preliminary survey has been completed, and it is estimated that at 2 *cash* for 2 buckets of water, the capital would yield 500 per cent annually."

BRIDGES

BRIDGE SITE, MANILA.—A stretch of land for the construction of the foundations of the new Ayala Bridge, to span the Pasig River, has been expropriated by the government. The Atlantic, Gulf and Pacific Company are the contractors.

"BIRTHDAY BRIDGE," SIAM.—Messrs. Howarth Erskine, Ltd., of Singapore, made the ironwork for the new "Birthday Bridge," Bangkok. The design is reported to be a novel and tasteful one, and forms a good example of the ironworkers' art and handicraft. This year the bridge was built out Sapatoomrd, near-Prince Svasti's palace.

PUBLIC WORKS

RECLAMATION OF WASTE LANDS, CHINA.—A central office having charge of the reclamation of waste lands will soon be established at Peking. The staff will be composed of officers appointed from the various imperial boards.

LUNETA EXTENSION, MANILA.—The bulkhead for that part of the Luneta extension upon which the new hotel is to stand is being constructed with great rapidity by the Atlantic, Gulf and Pacific Company. In a very short time the work of reclaiming the site will begin, the company's powerful dredger *Manila* being ready for the work.

PUBLIC WORKS DEPARTMENT, STRAITS SETTLEMENTS.—The annual report on the Public Works Department of the Straits Settlements, recently issued, shows that in 1904 the total expenditure in each settlement for public improvements was as follows:—Singapore, $1,369.041; Penang (including Province Wellesley and The Dindings), $753,270.50; Malacca, $245,557.65. Total, $2,367,869.15.

SEWER AND WATERWORKS CONSTRUCTION MANILA.—The Municipal Board of the City of Manila has taken steps to secure free entry through the customs of the imported materials for the construction of the new water and sewer systems of the city. Acting Governor-General Ide has brought the matter to the attention of the Collector of Customs for the Philippine Islands, Mr. W. Morgan Shuster, with request to comply with the provisions of the act of the Philippine Commission granting this privilege.

SEWERS, MANILA, P. I.—The underground survey of the city of Manila has been completed by the Department of Sewer and Waterworks Construction. This work was undertaken to determine the location of old sewers, drain pipes, etc., placed in the streets during Spanish domination and of which no records could be found. As fast as located these old installations were plotted on the block maps prepared by the department, and are now available for examination by intending bidders on the new sewer system.

PORT WORKS, DREDGING, DOCKS, ETC.

ANOTHER DOCK, SHANGHAI.—British merchants are negotiating to purchase a large tract of land at Yangtzepu, Shanghai, for the purpose of starting a dock.

PORT OF HAICHOU, CHINA.—The Peking authorities have refused a request that a Britisher be appointed to take charge of the engineering department of the new open port of Haichou.

NAVY DOCK, BANGKOK.—The dock at the Navy Yard in Bangkok, which is now being reconstructed, is being relined with stone and iron concrete in place of wood. The work is expected to be completed about the middle of February next. The dock will then measure 300 ft in length and 45 ft. in width, with 16 ft. on the sill at high water.

SHIPBUILDING, MARINE, ETC.

LAUNCHING AT BANGKOK.—The Siam Forest Company's new launch *Devaraj* has been successfully launched by the Bangkok Dock Company, Ltd.

NEW JAPANESE CRUISERS.—The 1st-class armored cruiser, which will be launched the current month from the Kure Naval Dock, will be named *Tsukuba*, and another which will be launched at the same dock later on will be called *Ikoma*.

A LIQUID FUEL BURNER.—The British steamer *Stettin* arrived in Manila the fore part of the current mo. from Sumatra with a large shipment of case oil consigned to a local firm. This vessel is owned by the R. S. Freeman, Shanghai, and is one of the few ocean-going carriers in Oriental waters that burns liquid fuel.

MESSAGERIES MARITIMES INCLUDES MANILA.—Messageries Maritimes, the great French steamship company, has extended its service to Manila and the Philippines. *Annam* was the first vessel of the company to arrive at Manila, coming into port early in December direct from Kobe, and sailing for Europe *via* Singapore and the Suez.

OPENING OF LU HAN RAILWAY, CHINA.—The Lu Han Railway, connecting Peking with Hankow, has been officially opened. The ceremony took place on the great bridge over the Hoangho (Yellow River). Monday, November 13th. The bridge lies, roughly, about the middle of the line. Trains are now running regularly in both directions.

NEW TRANSPACIFIC RECORDS.—The Pacific Mail Steamship Company has been creating new records lately. *Siberia* made the voyage from San Francisco to Honolulu in 4 ds. 19 hrs. 15 mins., and *Korea* has run from Yokohama to San Francisco in 10 ds. 11 hrs., the fastest time on record. Messrs Castle Bros-Wolf and Sons are Manila agents for this company.

LAUNCH OF IRON LIGHTER.—Messrs. Howarth Erskine, Ltd., have launched the first of 5 iron lighters which they are building. The size of the lighter is 105 ft. long by 23 ft. beam, with 9 ft. draught, and the carrying capacity is 300 tons. The others of the same size are, another one for the Arracan Company, 2 for the Borneo Company, Ltd., and 1 for another client.

REFLOATING RUSSIAN WARSHIPS, PORT ARTHUR.—The Russian gunboats *Gaidamak* and *Posaduik*, which were sunk at Port Arthur, have recently been refloated. They have recently been named *Shikinami* and *Makigumo*. The only sunked vessels now at Port Arthur are *Razboinik*, 1,492 tons; *Djigit*, 1,334; *Zabiaka*, 1,236; *Bobre*, 950, and *Amur*, 2,500. The number of Russian vessels refloated up to the end of October is 16.

STEAMER *Kaiping*.—The Chinese Engineering and Mining Company's splendid new steamer *Kaiping*, built at Wallsend-on-Tyne, arrived in Oriental waters recently in command of Captain Macfarlane. She brought out a cargo of iron for Japan and behaved herself handsomely during the voyage. She is one of the most up-to-date vessels now on the China Coast, and is a valuable acquisition for the rapidly increasing trade of the Chinese Engineering and Mining Company.

LAUNCH OF A JAPANESE LINER.—The Kawasaki Dockyard Company, Kobe, has successfully launched *Kaijo-maru*, a vessel which will soon fly the flag of the Osaka Shosen Kaisha, Ltd. This vessel has a length of 280 ft., a breadth of 39 ft., and a depth of 23 ft. She has a draught of 17 ft., a displacement of 3,570 tons, a gross tonnage of 2,100 tons, and her triple-expansion engines will develop a speed of 13¼ knots an hr., with a h. p. of 23,000. She will have accommodation for 280 passengers—20 1st-class, 30 2d-class, and 230 3d-class.

JAPANESE SHIPOWNERS CONFER.—At a conference of the Japanese Shipowners' Association in Tokyo, recently, a resolution was passed for the establishment, if such a measure proves necessary, of joint agencies at Hongkong, Shanghai, and Singapore, and the payment of a subsidy of Y6,000 per year the ships navigating to those ports. The report submitted to the conference showed that the number of vessels represented by the association is now 175, representing 315,972 tons. Of these 120 vessels, representing 231,285 tons, were chartered by the Japanese Government during the war.

BLUE FUNNEL LINE SHIPPING EXPANSION.—According to *The South China Morning Post*, the Blue Funnel Line, which now operates over 40 steamers, is building 5 vessels, 1 of which will be larger than the Hill liners *Minnesota* and *Dakota*. Trade with British Columbia, Puget Sound, and the Orient is growing so rapidly that the company has decided to place the new steamers on this run. The largest of the new steamers will have a displacement of more than 33,000 tons. The other 4 will not be so large as this one, but they will all be far larger than the ordinary Oriental freighters. They are being built in Glasgow and London, and it is said some of them will be launched in 1906. The *Machaon*, of the Blue Funnel Line, has a displacement of 13,000 tons, but compared with the new steamers she will look like a tugboat. All the new vessels are being built on the cantilever plan, acknowledged by marine experts to be the strongest and most convenient method of ship building.

LLOYD'S REGISTER OF SHIPPING FOR YEAR ENDED JUNE 30TH, 1905.—The report of this society for the period indicated throws much light upon the advances which have been made in shipbuilding and marine engineering, as well as upon the present condition of the shipping industry in general. The gradual improvement which has taken place in freights has no doubt contributed to the substantial increase in the aggregate tonnage of the vessels which have been built under survey during the period in question for classification in Lloyd's Register Book, the total being 1,200,827 tons. The fact that, while the tonnage mentioned is an increase of about 120,000 tons over the corresponding figure for the previous year, the number of vessels represented is actually smaller, draws attention to the continued tendency towards the building of still larger vessels. Thus there are included in this total no fewer than 24 steamers of over 5,000 tons each, amongst which the largest are two of over 20,000 tons each, one of over 19,000 tons, and one of over 13,000 tons, built for the Great Northern Steamship Company, the Cunard Steamship Company, Limited, and the Pacific Mail Steamship Company, respectively. Among the types of vessels classed by Lloyd's Register during the year may be mentioned bulk-oil carriers, steamers to burn liquid fuel, trunk-deck and turret-deck steamers, and the now almost familiar turbine steamers. While the declaration of peace in the Far East is probably too recent to have affected the output of tonnage completed during the period under review, intelligent anticipation of this event is, perhaps, partly responsible for the fact that on June 30th last the total tonnage building under the inspection of the society's surveyors reached the very large total of 1,123,678 tons, as compared with 901,814 tons 12 mos. previously—an increase of nearly 25 per cent.

MINES AND MINING

HWANG-HAI-DO GOLD MINE, KOREA.—Japan has withdrawn from the scheme for working this property, originally proposed by Japan, Great Britain and America.

COAL DISCOVERY, CHINA.—A seam of coal 1ft. thick at a depth of 494 ft. has been struck on the property of the Peking Syndicate, Ltd. The main seam underlies at a depth of from 40 ft. to 100 ft.

GOLD DISCOVERY, KOREA.—It is reported that a promising gold deposit has been discovered at Syungchun, about 35 ms. to the NE. of Hamhueng, Korea, and that efforts are being made by the Japanese to obtain a license to work the mine.

EXPERT INSPECTION OF MINES, CHINA.—The Peking Government has sanctioned the memorial endorsing the desire of Viceroy Chou Tu to despatch experts to inspect and report upon the mines in Kiangsu, Kiangsi, and Anhui.

MINING ENTERPRISE IN KOREA.—The Korean Government has been requested by the Japanese to grant permission to Baron Shibusawa and another Japanese to work the gold mine at Hamheung, in Hamgyongdo; and Messrs. Mitsui and Kobayashi the copper mine at Kosan, in the same province.

PRODUCTION OF TIN.—The world's output of tin in 1904 amounted approximately to 92,243 tons, of which the Federated Malay States supplied 58,657 tons and Australia 5,082 tons. The Federated Malay States heads the list in the quantity produced with many tons to spare. This country has led in the tin-mining industry since 1902.

OPPOSITION TO PEKING SYNDICATE.—It is announced that the Governor of Honan Province, China, has written both to the Board of Foreign Affairs and the Board of Commerce opposing the proposed opening up of certain iron deposits in the Prefecture of Huaichingfu, in that province, by the Peking Syndicate, giving as his reasons certain clauses in the imperial mining regulations.

MINES IN KUANGSI, CHINA.—It is reported that negotiations are proceeding between China and France regarding mines and railways in the Province of Kuangsi. It is proposed by the French minister at Peking that the mining and railway enterprises in the province should be undertaken by China and France jointly, and he has assured the Peking Government that the French Government would then be willing to remit 3/10 of the annual installment of the Boxer indemnity. Mr. Chazalon, a French merchant, is engineering the scheme.

KOLAR GOLD FIELDS, INDIA.—Following are the returns for the month of October, 1905:—*Balaghat*.—4,200 tons of quartz crushed yielded 3,378 oz. and 2,750 tons of tailings cyanided yielded 289 oz. Total, 3 667 oz. gold. *Champion Reef*.—Milled 19,650 tons, which produced 15,606 oz. of gold. 16,950 tons of tailings treated by the cyanide process produced 2,195 oz of gold, making a total production of 17,801 oz. gold. *Mysore*.—16,750, tons of quartz crushed produced 15,189 oz gold, and 13,725 tons of tailings cyanided yielded 2,114 oz Total production 17,303 oz. gold. *Mysore West*.—Mill ran 684 hours, crushed 2,152 tons, and yielded 1,026 oz. bar gold; 2,688 tons of tailings treated by the cyanide process yielded 129 oz. of standard gold. *Nundydroog*.—6,800 tons of quartz crushed yielded 5,200 oz. and 7,020 tons of tailings cyanided yielded 616 oz., total 5,816 oz. of gold. *Ooregum*.—Stuff crushed 10,595 tons, gold produced 4,576 oz. and slimes and tailings cyanided 10,098 tons gold produced 969 oz. Total 5,545 oz. of gold. *Hutti* (Nizam's).—821 oz of gold from 2,150 tons of quartz crushed, and 183 oz. from 1,600 tons of tailings cyanided, total 1,004 oz. gold.

BORNEO OIL OUTPUT.—Reports from the head office of the Nederlandsch Indische Industrie en Handel Maatschappij, covering the output of the oil fields in Borneo for the third 13 weeks and first 39 weeks of the years 1905 and 1904, show the following:

	Third 13 weeks.		First 39 weeks.	
	1905 Tons.	1904. Tons.	1905 Tons.	1904. Tons.
Production—				
Crude oil	91,485	77,570	282,575	204,120
Refinery intake—				
Crude oil	78,140	66,819	214,639	178,752
Shipped elsewhere for refining	10,065	5,561	55,589	11,061
Refinery output—				
Kerosene	30,610	19,017	85,380	53,691
Other products	39,701	41,460	109,596	102,911
Shipments—				
Kerosene	25,278	17,413	85,694	50,638
Other products	46,235	37,504	113,498	98,359
Stock awaiting shipment—	Oct. 2, 1905		Oct. 1, 1904	
Kerosene	14,830		4,840	
Other products	8,600		12,200	
Crude oil in stock above ground	24,240		28,705	

MINERAL DEPOSITS IN MANCHURIA.—The American consul at Newchwang, Mr. Sammons, makes the following report:—It is known that there are valuable mineral deposits in Manchuria. Coal has been mined for several years in a primitive way, and the operations of the Russians in this direction attracted attention near Mukden. Gold, both in quartz and placer, is found, as is copper, silver, and other minerals. But just what the field offers in the way of practical mining possibilities is, as yet, subject to careful investigation. Many agree, however, that Manchuria is one vast field of mines and rich farming and grazing lands. Indeed, some of the samples of ore promise fabulous results, but as a rule the question entering into the operation of, and as yet, indeed, the securing of title to, good properties are indefinite and too nebulous at this particular time to prove attractive to capital. With war at an end and ample and well-defined government regulations in force the exploitation of mining enterprises in Manchuria will be open to serious examination. The indications, or "croppings," certainly warrant thorough prospecting of undeveloped properties and expert opinions where capital seeks investment in mines that have a right to be called such. Manifestly all matters pertaining to the development of mining properties are practically at a standstill in Manchuria. In many parts of China, as well as in various countries of the world, there exists a belief that the mineral deposits of Manchuria are fabulously rich. This belief may, in part, be accounted for by the popular idea that an unknown mineral or gold district possesses great wealth.

MISCELLANEOUS NOTES.

DE DION AGENCY, SIAM.—It is announced that Messrs Howarth Erskine, Ltd., of Singapore, have been appointed sole agents in Siam for the well-known De Dion motor cars. One De Dion and 3 Beeston-Humber cars are due to arrive there shortly.

HEATING STOVES FOR CHINA.—The Chinese are reported to be taking to foreign stoves for heating their houses. It is predicted that an immense trade in this line can be worked up in Manchuria, where the winters are long and very cold.

COTTON CULTIVATION, KOREA.—It is announced that the Korean Government, at the instance of the Japanese Government, will soon establish 30 cotton plantations in Chholla-do. During the next 3 yrs. Korea will disburse about -Y-100,000 as expenditure for the cultivation of cotton.

STANDARD OIL IN MORO PROVINCE, P. I.—The Standard Oil Company of New York is reported to have decided upon Zamboanga, Island of Mindanao, P. I., as a supply depot for the S. Islands of the Philippine Archipelago, and will erect a warehouse capable of holding 30,000 cases of oil, over the waters of the bay, opposite Calle Adoves, in Magay.

AMALGAMATION OF MATCH FACTORIES, JAPAN.—There is a plan on foot to amalgamate the principal match factories in Osaka and Kobe, which a committee is perfecting. The match factories of Osaka number 51 and produce an annual output representing about -Y-4,000,000 in value, while those of Kobe are 60 in number, with an output of the value of -Y-1,500,000.

INSULAR CONTRACTS, MANILA.—Major Shields, chief of the Bureau of Supplies, Philippine Islands, has awarded a contract to Mariano Joaquin for Metz metal involving an expenditure of ₱16,000. Messrs. H. W. Peabody & Co. have also secured a contract to furnish the insular government with 17,000 ft. of galvanized iron pipe. The contract price is ₱17,000.

SUGAR WAREHOUSES, HONGKONG.—The colonial governor at Hongkong has directed that the godowns of the Hongkong and Kowloon Wharf and Godown Company, Ltd., situate at Kowloon shall be warehouses set apart for the storage of sugar in transit, under the regulations for the import and export of sugar in transit, under the Sugar Convention Ordinance, 1904.

MESSRS. FINDLAY & CO.'S BIG CONTRACT, PHILIPPINES.—Messrs. Findlay & Co., of Manila, have been awarded the contract for supplying all the lumber, sashes and windows to be used in the construction of the buildings at the Olongapo Navy Yard. This is the second large contract which this firm secured within a mo., bringing the total quantity of lumber to be supplied up to over 2,000,000 board ft.

ENGINEERING PAPER FOR SIAM.—The Engineering Society of Siam, with headquarters at Bangkok, has begun the publication of an official journal which has been entitled *Siam Engineering*. The journal is to be issued quarterly as an experiment, and if sufficient support be forthcoming it is proposed to enlarge its scope and to make it a monthly illustrated journal of a highly technical character.

AGRICULTURAL MACHINERY, MANILA, P. I.—Messrs. Castle Bros Wolf & Sons, Manila, are importing into the Philippines an immense stock of the best agricultural machinery of American manufacture. The firm has secured large show-rooms at the corner of Calles Binondo and Barraca, Manila, in which to display their goods. Captain Thomas Leonard, manager of the Agricultural Department of the firm, is in personal charge of the show-rooms.

OPENING OF MANCHURIA.—The American minister at Peking recently paid a visit to the Chinese foreign office and made inquiries as to the opening of the 3 eastern provinces, and the date when the opening is likely to take place. Mr. Rockhill informed the officials that one reason why America endeavored to bring about peace between Japan and Russia was that she desired to see the development of trade in Manchuria. The Chinese replied that China has decided to open Manchuria to foreign trade, but the method of doing so is still under consideration.

FERRO CONCRETE CONSTRUCTION, STRAITS SETTLEMENTS.—Messrs. Riley, Hargreaves & Co., Ltd., engineers and contractors, Singapore, are erecting in Ferro Concrete for the Government of the Straits Settlements a large lighthouse at One Fathom Bank, Straits of Malacca. They are also erecting in Ferro Concrete two large bridges at Pandan and Gelang Rivers for the colonial government and the Municipality of Singapore. Messrs. Riley, Hargreaves & Co. hold the patent rights for this process of construction and are open to compete for buildings or erections of any kind.

CHAMBER OF COMMERCE, NEWCHWANG.—The Port of Newchwang now has a chamber of commerce for the first time in 50 yrs. The committee is composed of Mr. H. A. Bush, chairman; Mr. Ross Thomson, vice-chairman; Mr. O. Hoppe, manager of Messrs. Arnhold, Karberg & Co.; Mr. C. M. McCaslin, manager of the Standard Oil Company of New York, and Mr J. Nakamura, manager of the Yokohama Specie Bank. Mr. H. F. Bush is honorary secretary. Captain G. Peacock represents the Newchwang Pilot Association in the New organization. All mercantile firms and persons engaged or interested in the commerce or shipping of China are eligible for admission as member, the annual subscription being Tls. 30.

FAR EASTERN IRON AND STEEL TRADE.—Far Eastern trade for iron and steel is very active in England at the present. From both Japan and China orders for workshop machinery on an unusually extensive scale are being received by every mail. Among other features of this demand is an order from China for a steelwork plant of so elaborate and complete a character, according to the *London and China Express*, that when set up it is likely to prove more efficient than many of the steel equipments in Sheffield itself. The specifications for this plant have been drawn up by a British engineer in the service of the Chinese Government, and orders have been given that no expense be spared in securing an installation as perfect as the best resources of Sheffield can make it.

ALKALI IN CHINA.—Special Agent Burrill gives out from Shanghai a report on the sale and use of alkalies in China. He explains that the entire business is practically in the hands of an English firm. Messrs. Brunner, Mond & Co., Ltd., of Northwich, Eng., have controlled absolutely the sale of alkalies in China since January, 1901. At that time this firm established a branch in Shanghai, and has run the Chinese product out of the market. By a business agreement among the English manufacturers of this material Messrs. Brunner, Mond & Co. are entitled for a period of years to sole representation in the Chinese market. The business, starting from nothing, has grown to large proportions The firm's sales have reached 1,500 tons of all products, and rarely fall below 500 tons per mo., at an average price of approximately $50 per ton.

MACHINERY NEEDED AT AMOY.—The American consul at Amoy, China, reports an opportunity to introduce windmills and rice hullers in the vicinity of Amoy, China, where rice is extensively raised but without the aid of labor-saving machinery. Here rice is hulled in the ancient way by the coolie who beats the hulls from the rice in a large mortar with a padded maul. Some of the large rice establishments use a beating contrivance in which the maul is at one end of a beam which the coolie works with his feet and weight, hulling about 150 lbs. per pay. In the French possessions, S. China, windmills have been introduced to operate rice hulling devices, and they will doubtless soon be in use in Amoy where they would be favored by the steady winds. Here windmills could also be put into use for raising the water with which the rice fields are flooded.

BANGKOK'S (SIAM) IMPORT AND EXPORT TRADE.—The total value of the import and export trade of Bangkok, for 1904, according to official reports just issued, reached the unprecedented sum of £10,014,141 showing an increase of £2,582,904 over the figures of 1903, and £2,086,195 on the returns for the hitherto record year, 1902. The importation of steel, iron and machinery shows a remarkable increase, being at £370,392, considerably more than double either the sum for 1903 or the average for the past 5 yrs. The increase occurs in every item included under this sub-head, save in iron sheets and plates. It is principally in milling machinery, iron sheets and plates, bars and miscellaneous manufactures of steel that England has afforded the greater supply. The customs returns show that the increase in steel is due almost entirely to import of rails for the Royal Railway Department. Seven rice mills erected during the year, 5 replacing former mills and 2 being new ventures, account for the increase in machinery.

FINANCIAL NEWS.

NETHERLANDS TRADING SOCIETY.—It is reported that this concern is about to establish a branch of its bank at Hongkong.

HONGKONG STEAM WATERBOAT COMPANY, LTD.—This company announces that it will declare a dividend of 5 per cent for 1905.

SIAM'S BUDGET, 1905-6.—Estimate of revenue, Tcs. 53,000,000; expenditure chargeable to revenue, Tcs. 52,873,083; surplus, Tcs. 126,917.

KWANSEI RAILWAY COMPANY.—It is reported that this company has successfully concluded negotiations for a foreign loan of -Y-10,000,000.

JAPAN'S BUDGET, 1905-6.—In Japan's 1905-6 budget the estimated surplus is $45,938,890. This is nearly 3 times the surplus of any prior year in the history of Japan.

DEUTSCHE-ASIATISCHE BANK.—A branch of this bank, which has been doing business in China for a number of years, recently opened its first branch in Japan at Yokohama.

CHINA TRADERS' INSURANCE COMPANY, LTD.—The directors of this corporation have recommended the payment of a general dividend of 18 per cent (4.50 per share), and a bonus to contributors of 15 per cent.

ORIENTAL TELEPHONE AND ELECTRIC COMPANY, LTD.—Application has been made to the committee of the Stock Exchange, London, to allow the security of this company—£100,000 4 per cent redeemable debenture stock—to be quoted in the Official List.

SIAM'S BUDGET, 1905-6.—The budget issued for the Siamese year 124 (1905-6) estimates the revenue at £2,953,645 and the expenditures at £2,946,572. A sum of £323,229 is assigned to railway construction, but it will be charged to the loan recently negotiated.

JAPAN AND CHINA SYNDICATE, LTD.—Another recent registration is the Japan and China Syndicate, Ltd., which has a capital of £10,050 in 1,000 ordinary shares of £10 each and 1,000 deferred shares of 1s. each. It is formed to acquire lands, farms, mineral and other properties, concessions, and rights in Japan, China, and other parts of Asia or elsewhere.

INDUSTRIAL BANK OF JAPAN.—This financial institution intends to increase its share capital by -Y-7,500,000, making a total of -Y-17,500,000. The new shares, it is understood, will be taken up by a British syndicate in London, with whom an agreement has been made by the bank, through Mr. Takhashi, vice-governor of the Bank of Japan. The scheme is yet subject to the approval of the shareholders of the bank.

INDO-CHINA LOANS.—In 1898 the Indo-China Government was authorized to issue loans amounting to fr. 200,000,000 for constructing railways. Of this fr. 50,000,000 are issued at 3½ per cent interest in 1899, and fr. 70,000,000 at 3 per cent in 1902. The balance of fr. 80,000,000 is about to be issued, like the others, through the Banque de l'Indo-Chine. The rate of interest for this issue, it is believed, will be 3½ per cent.

SANYO RAILWAY COMPANY, JAPAN.—At the general meeting of this corporation held recently in Kobe, the following accounts were passed by the shareholders:—Net profit,-Y-1,927,161; balance brought forward,-Y-674,140; total,-Y-2,601,301. To reserves,-Y-96,400; to rewards to officers,-Y-12,500; to dividend, 8 per cent *per annum*,-Y-1,224,970; to bonus to shareholders, 2 per cent *per annum*,-Y-306,190; carried forward,-Y-961,241.

KANSAI RAILWAY COMPANY, JAPAN.—At the recent general meeting of this company, held at Yokkaichi, the following accounts were approved, as was also the proposal of raising a foreign loan through the firm of Messrs. Samuel Samuel & Co.:—Net profit, -Y-721,583.764; balance brought forward,-Y-4,409,462; total,-Y-725,993.226. To reserves,-Y-37,000; to dividend 5.6 per cent *per annum*,-Y-677,090.400; carried to next account,-Y-11,902.826.

NATIONAL BANK, BANGKOK.—It is understood that a number of influential Siamese and Chinese residents are forming a syndicate with a view of starting a national bank at Bangkok, and that the Book Club which has been doing a very good business as a Siamese banking concern, is to be amalgamated with the new bank. The capital of the company is to be Tcs. 4,500,000 in 3,000 shares of Tcs. 1,500 each, and nearly all the shares are taken up.

INTERNATIONAL COTTON MANUFACTURING COMPANY, LTD., SHANGHAI.—In their report to the shareholders at the 10th annual meeting the directors of this company show that including the balance brought forward from the previous year of Tls. 13,629.29 there is a sum of Tls. 152,727.27 at the credit of profit and loss account. This balance will be disposed of as follows:—Writing off plant and machinery, Tls. 50,000; mill building, Tls. 17,805.20; Chinese houses, Tls. 5,416.20; mill stores, Tls. 5,787.21; ginning mill, Tls. 5,000; place to reserve, Tls. 50,000, and carry to new account, Tls. 18,718.86.

HOTEL DES COLONIES, LTD., SHANGHAI.—At an extraordinary general meeting of this company, recently held, the shareholders voted power to the directors to enter into negotiations with the owners of the property with a view to purchasing the same. Should the deal go through it is understood that Hotel des Colonies, Ltd., will convert the property into an up-to-date, modern hostelry. Tls. 225,000 is asked by the owners, which the company does not accept. Hotel des Colonies has paid an average dividend of 6½ per cent to shareholders for the last 3 yrs., and is under excellent management. The company's lease of the property has yet 2 yrs. to run.

CHINESE ENGINEERING AND MINING COMPANY, LTD.—The board of directors of this company having declared a final dividend of 1s. per share, free of income tax, for the year ended February 28th, 1905, holders of bearer shares and holders of dividend warrants received from London on account of registered shares, will be paid their dividends on presenting their No. 5 coupons of the bearer shares and the dividend warrants on registered shares to either of the following banks at Shanghai or Tientsin:—Chartered Bank of India, Australia and China and Russo-Chinese Bank. The payment will be made in either dollars or taels as the holder may wish, at the buying rate of exchange of the day.

TIENTSIN-SHANHAIKUAN RAILWAY.—This railway is reported to be reaping large profits. After paying off the interest on the British bonds and redeeming those, the numbers of which came out of the annual drawing, and after defraying the running expenses, and appropriating a large sum as a loan for the construction of the Peking-Kalgan Railway, in 1904, there was left a net profit of over Tls. 1,200,000. Out of this sum, Tls. 800,000 will be presented to the Throne to replenish the privy purse; Tls. 200,000 will be set apart for the Peiyang Administration; the administrator of Northern Railways will receive Tls. 100,000, and the remaining lakh or so will be divided among the employees in proportion to their monthly salaries.

EASTERN EXTENSION, AUSTRALIA AND CHINA TELEGRAPH COMPANY.—According to *The London and China Express* the directors of this company in their report for the half-year ended June 30th last show that the gross receipts during that period amounted to £348,849, against £300,057 for the corresponding half-year of 1904. The working expenses, including £21,455 for maintenance of cables, absorbed £135,950, against £141,707 for the corresponding period of 1904, leaving a balance of £212,899. From this is deducted £3,383 for income tax, and £14,615 for interest, etc., on debenture stock, leaving £194,900 as the net profit for the half-year. After adding £22,181, brought forward from the previous half-year, there is an available balance of £217,081. Two quarterly interim dividends of 1¼ per cent each, amounting to £75,000, have been paid for the half-year, leaving £142,881, of which £100,000 has been transferred to the general reserve fund, and the balance of £42,081 is carried forward. The tariff for telegrams transmitted between Japan and Europe by the company's route was reduced on July 1st last from 5s. 8d. to 4s. 10d. per word, making the rate the same as by the Great Northern Company's route *via* Russia.

FAR EASTERN SHARE QUOTATIONS

COURTESY OF BENJAMIN, KELLY & POTTS, SHAREBROKERS, HONGKONG, December, 1905.

STOCKS	WHEN ESTAB-LISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation* PER CENT	CLOSING QUOTATIONS
Banks.												
Hongkong and Shanghai Banking Corporation	1865	$10,000,000	80,000	$125	$125	g £1,000,000 s $8,500,000 i $250,000	$1,702,728	30-6-05	£1.15/- at exchange 1/10½= $18.66.67 for first half-year 1905	21-8-05	5	$875 buyers London £93½
National Bank of China, Limited	1891	£699,475	99,925	£7	£5	$200,000	$41,768	31-12-04	$2 (London 3/6) for 1903	1-2-04	—	$38 buyers
Marine Insurances.												
Canton Insurance Office, Limited	1881	$2,500,000	10,000	$250	$50	$1,600,000 j $147,895	$211,540	31-12-04	$20 for 1904	21-10-05	6	$330 sellers
China Trader's Insurance Co., Ld.	1865	$2,000,000	24,000	$83.33	$25	$950,000 f $151,992 j $362,366 u $371,445	Nil.	30-4-04	$4½ for year ended 30-4-1904	8-12-04	5	$89 buyers
North China Insurance Co., Ld.	1863	£150,000	10,000	£15	£5	g £100,000 s Tls. 100,000 f Tls. 50,000	Tls. 302,053	30-6-05	Final of 7/6 for making 15/- for 1904	25-10-05	5½	Tls. 92½
Union Insurance Society of Canton, Limited	1867	$2,500,000	10,000	$250	$100	s $2,000,000 g £40,000 f $331,453 j $1,043,930 u $1,152,346	$2,339,112	30-6-05	$40 for 1904	20-1-04	5½	$750 sellers
Yangtsze Insurance Association, Ld.	1862	$800,000	8,000	$100	$60	$750,000 i $50,000 j $5,890	$599,364	31-12-05	$12 and $3 special dividend for 1903	12-4-05	8½	$170
Fire Insurances.												
China Fire Insurance Co., Ld.	1870	$2,000,000	20,000	$100	$20	$1,000,000 x $218,039 f $2,241	$260,374	31-12-04	$6 dividend and $1 bonus for 1903	10-3-05	8¼	$86 buyers
Hongkong Fire Insurance Co., Ld.	1868	$2,000,000	8,000	$250	$50	$1,200,505	$360,372	31-12-04	$34 for 1903	7-3-05	10½	$335 buyers
Shipping.												
China and Manila Steamship Co., Ld.	1882	$750,000	(1) 30,000	$25	$25	$5,000	$8,832	31-12-04	$1 for 1904	27-3-05	5½	$20 sellers
Douglas Steamship Co., Ld.	1883	$1,000,000	20,000	$50	$50	$261,638 i $88,941	Nil.	30-6-05	$3½ for year ended 30-6-1905	25-9-05	10	$35 buyers
Hongkong, Canton and Macao Steamboat Company, Ld.	1865	$1,200,000	80,000	$15	$15	e $250,000 di $600,000 f $145,376	$8,064	30-6-05	$1 for first half-year 1905	16-8-05	8	$25
Indo-China Steam Navigation Company, Ld.	1882	£1,200,000	(2) 60,000	£10	£10	£120,000 i £241,150 h £3,999	£4,435	31-12-04	12/- @ 1/10 7-8=$6.29.51 for 1904	13-7-05	6½	$95
Shanghai Tug and Lighter Co., Ld. Do. Preference.	1903	Tls. 1,500,000	200,000 100,000	Tls. 50	Tls. 50	i Tls. 25,000	Tls. 43,762	31-12-04	Interim of Tls. 2. for 1905 Interim of Tls. 1¾ for 1905	28-8-05	8 8	Tls. 55 sales Tls. 48 sales
"Shell" Transport & Trading Co., Ld.	1898	£2,000,000	2,000,000	£1	£1	£400,000 i £4,116	£58,852	31-12-03	Interim of 1/- (Coupon No. 5) for '04	1-1-05	4	25/-
"Star" Ferry Co., Ld.	1898 1900	$200,000	10,000 10,000	$10 $10	$10 $5	$65,000 i $24,257	$929	30-4-05	$1.80 / $0.90 cents for year ended 30-4-05	29-5-05	5½ 3¼	$32 buyers $23
Straits Steamship Co., Ld.	1890	$500,000	(3) 5,000	$100	$100	$400,000 e $21,075 i $130,153	$21,231	31-12-04	$10 for 1904	21-3-05	7	$149 buyers
Taku Tug & Lighter Co., Ld.	—	T.T 1,500,000	30,000	T. Tls. 50	T. Tls. 50	Tls. 98,000 d Tls. 195,479 e Tls. 28,000 i Tls. 81,200	Tls. 4,333	31-12-04	Interim of Tls. 2 for 1905	27-7-05	12¼	Tls. 33 sales
Refineries												
China Sugar Refining Company, Ld.	1878	$2,000,000	20,000	$100	$100	e $450,000 r $150,000	$42,812	31-12-04	Interim of $10 for 1905	18-8-05	9½	$215 sellers
Luzon Sugar Refining Company, Ld.	1882	$700,000	7,000	$100	$100	none	Dr. $85,987	31-12-04	$3 for 1897	24-3-98	—	$25
Perak Sugar Cultivation Co., Ld.	—	Tls. 350,000	7,000	Tls. 50	Tls. 50	Tls. 100,000	Tls. 3,723	31-7-05	Tls. 2½ for year ending 30-9-1904	17-12-04	—	Tls. 68 sellers
Mining.												
Chinese Engineering & Mining Co., Ld.	1901	£1,000,000	1,000,000	£1	£1	d £80,000 h £12,289	£13,355	28-2-05	Final of 1/- (No. 5)	2-11-05	—	Tls 8.60 buyers
Oriental Consolidated Mining Co., Ld.	1901	G. $5,000,000	y 500,000	G. $10	G. $10	none	G. $672,093	31-12-04	Interim of 50cts. (gold) for '05 (No. 5)	11-7-05	—	G. $18 buyers
Raub Australian Gold Mining Co., Ld.	1892	£200,000	150,000 50,000	£1 £1	18/10 £1	£4,873	Dr. £8,745	31-3-05	No. 12 of 1/-=48 cents	28-1-01	—	$3½ buyers

STOCKS	WHEN ESTAB-LISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation* PER CENT	CLOSING QUOTATIONS
Docks, Wharves and Godowns.												
Farnham (S. C.), Boyd & Co., Ld	1901	T5,520,000	55,200	T100	T100	T1,000,000	.........T34,924	30-4-05	Final of T8 making T13 for 1904/05	24-6-05	9½%	T137 buyers
Fenwick (Geo.), & Company, Ld.....	1889 1905	$450,000	6,000 *z* 12,000	$25	$25	$70,000	.... $8,577	31-12-04	$3¼ for 1904, on 6,000 shares.... First year..................................	13-3-05 —	— —	$26 $24½ buyers
Hongkong and Kowloon Wharf and Godown Co., Ld........................	1886	$2,000,000	40,000	$50	$50	$250 000 *d.r.* $58,423 *i* $10,000 *p* $300,000	.........$29,422	31-12-04	Interim of $2½ for 1905...............	26-7-05	4¾%	$106 buyers
Hongkong & Whampoa Dock Co., Ld.	1901	$2,500,000	50,000	$50	$50	*i* $41,500	........$501,332	30 6-05	$6 for first half year '05	22-8-05	7¼%	$165
New Amoy Dock Co., Ld......................	1892	$67,500	10,000	$6¾	$6¾	$55,500	*Dr*....$10,260	31-12-04	$1¼ for 1903..................................	5-5-04	7 %	$17
Shanghai and Hongkew Wharf Co. Lt.	1902	T3,200,000	32,000	T100	T100	*b* T487,210 *r* T59,880	........T10,711	31-12-04	Interim of T6 for 1905..................	23-8-05	6 %	T197½ buyers
Yangtsze Wharf and Godown Co., Ld..	1902	T250,000	2,500	T100	T100	T17,500	..........T2,762	31-12-04	T18 for 1904...................................	29-3-05	9¼%	T190 buyers
Lands, Hotels and Buildings.												
Astor House Hotel Co., Ld.................	1901	$750,000	(*4*) 30,000	$25	$25	$14,156	...........$9,028	30-6-05	$2½ for year ending 30-6-1905......	19-8-05	9 %	$27½ buyers
Astor House Hotel, Ld. (Tientsin)	—	T. T100,000	2,000	T. T50	T. T50	T34,000 *e* T8,000	.... T806	29-2-05	Interim of T5.....	21-10-05	8 %	T125 buyers
Central Stores, Ld..........................	—	$91,845	6,000	$15	$12	$20,000	..........$1,502	31-12-04	Final of 60 cents making $1.80 for 04..	30-3-05	12 %	$15
Do. (Founders')............			123	$15	$12				None.........	—	—	$100
Do. (New Issue)...............	1904	$360,000	24,000	$15	$7½				Preferential of 7% for '04...........	30-3-05	7 %	$7½ sales
Hongkong Hotel Co., Ld.	1866	$600,000	12,000	$50	$50	$648,975 *r* $31,087	.........$10,126	30-6-05	$5 for first half-year 1905...............	4-9-05	6¾%	$150
Hongkong Land Investment and Agency Co., Ld.	1889	$5,000,000	50,000	$100	$100	*e* $250,000	.........$37,875	31-12-04	Interim $3½ for 1905.....................	27-7-05	5½%	$125 buyers
Hotel des Colonies Co., Ld. (Shanghai)	1902	T225,000	9,000	T25	T25	*n* T20,986	.... T7,202	31-3-05	Interim of T1..................................	1-11-05	15 %	T16 sales
Hotel Metropole Company, Limited	1904	$200,000	2,000	$100	$100	none	............$4,699	30-6-05	Final of $6 making $10 for the year.	26 7-05	9¾ %	$102½
Humphreys' Estate & Finance Co., Ld.	1887	$1,500,000	150,000	$10	$10	*i* $200,994 *e* $50,000	.........$11,958	31-12-04	90 cents for 1904..........................	11-2-05	7 %	$12½
Kowloon Land and Building Co., Ld. ..	1889	$300,000	6,000	$50	$30	none	.... $377	31-12-04	$3 for 1904......................................	31-1-05	7½%	$40 buyers
Shanghai Land Investment Co., Ld......	1901	T2,600,000	52,000	T50	T50	T828,813 *e* T170,000	.........T40,066	31-12-04	Interim of T3 for 1905..................	21-7-05	6¾%	T122 sellers
Tientsin Hotel des Colonies, Ld.	1903	T70,000	1,400	T50	T50	none	.... T670	31-12-04	Interim of T3 for 1905...........	4-7-05	12 %	T45 sellers
Tientsin Land Investment Co., Ld.......	1902	T772,600	7,726	T100	T100	*i* T67,300	.... T725	31-12-04	Interim of T3 for 1905..................	2-8-05	6 %	T115 sellers
West Point Building Co., Ld.	1889	$625,000	12,500	$50	$50	none	...........$1,247	31-12-04	Interim of $1¾ for 1905..................	27-7-05	6¾%	$55 sellers
Cotton Mills.												
Ewo Cotton Spinning and Weaving Co., Ld..	1895	T750,000	15,000	T50	T50	none	.........T12,844	31-10-04	T4 for year ended 31-10-1903..........	22-12-03	6½%	T65 buyers
Hongkong Cotton Spinning, Weaving and Dyeing Co., Ld..................	1901	$1,250,000	125,000	$10	$10	*e* $30,000	.........$23,264	31-7-05	$1 for year ended 31-7-1905............	4-9-05	7 %	$14
International Cotton Manufacturing Co., Ld.	1895	T750,000	(*5*) 10,000	T75	T75	T100,000	.........T18,718	30-9-04	Interim of 3% a/c 1898..................	30-4-98	—	T44 sales
Laou-kung-mow Cotton Spinning & Weaving Co., Ld.	1895	T800,000	(*6*) 8,000	T100	T100	none	.........T10,000	31-12-04	Interim of 4% a/c 1898 on 6,000 shares	1-8-98	—	T60 buyers
Soey Chee Cotton Spinning Co., Ld.....	1895	T1,000,000	2,000	T500	T500	*l* T5,658	.........T22,051	31-12-04	4 % for 1897..................................	2-2-98	—	T250 buyers
Miscellaneous.												
Anglo German Brewing Co., Ltd.	1904	$100,000	4,000	$100	$100	none	...............$20	31-12-04	None..	—	—	$100
Bell's Asbestos Eastern Agency, Ld......	1895	£5,377.10s	8,604	12/6	12/6	£314	............£770	31-12-04	1s. 3d per share for 1904................	21-7-05	9¼%	$7 buyers
Campbell, Moore & Co., Ld................	1886	$12,000	1,200	$10	$10	$8,000	...........$1,182	31-12-04	$3 for 1904	1-4-05	8¼%	$36
China-Borneo Co., Ld........................	1903	$720,000	(*7*) 60,000	$12	$12	none	—	31-12-04	$1 for 1904	17-3-05	10 %	$10 sellers
China Flour Mill Co., Ld.	—	T200,000	4,000	T50	T50	T30,000	..............T718	31-12-04	Interim of T5 for 1905	24-7-05	—	T85 sellers
China Light and Power Co., Ld.	1901	$500,000	50,000	$10	$10	none	...........$3,739	29-2-04	None	—	—	$10
China Provident Loan and Mortgage Co., Ld.	1898	*a* $1,000,000	100,000	$10	$10	$80,000	...........$1,581	31-12-04	**80 cents for 1904**...............	18-1-05	8¾%	$9¼ buyers
Dairy Farm Company, Ld..................	1896	$187,500	25,000	$7½	$6	$25,000	...........$2,864	31-7-05	**$1.20 for year ending 31-7-1905**......	24-11-05	7½%	$16

STOCKS	WHEN ESTABLISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation* PER CENT	CLOSING QUOTATIONS
Miscellaneous.—Continued												
Green Island Cement Co., Ld	1889	$1,500,000	150,000	$10	$10	*p* $400,000 / $500,000	$95,054	31-12-04	$2 for 1904	27-2-05	7 %	$28½
Hall & Holtz, Ld.	—	$420,000	(*8*) 21,000	$20	$20	$186,000	$7,551	29-2-05	Final of $1½ making $2½	15-4-05	10 %	$25
Hongkong Electric Co., Ld.	1889 / 1899	$600,000	30,000 / 30,000	$10 / $10	$10 / $10	none	$2,151	30-4-05	$1.00 / 50 cents for year ending 30-4-05	17-7-05	6¾% / —	$15 buyers / $14½ buyers
Hongkong High-Level Tramways Co., Ld.	1887	$125,000	1,250	$100	$100	$50,000	$2,796	30-11-04	$15 for year ending 30-11-04	24-12-04	7 %	$225
Hongkong Ice Company, Ld.	1881	$125,000	5,000	$25	$25	*k* $60,000	$5,356	31-12-04	Interim of $4 for 1905	2-8-05	7 %	$235
H'kong Rope Manufacturing Co., Ld.	1883	$500,000	10,000	$50	$50	$60,000	$11,137	31-12-04	$10 for 1904	10-4-05	7 %	$152 buyers
Hongkong Steam Waterboat Co., Ld.	1900	$150,000	15,000	$10	$10	$2,500	$88	30-9-04	Final of 50 cents making $1 for year ended 30-9-1905	24-11-05	7¾%	$13
Lane, Crawford & Co., Ld. (Shanghai).	1903	$250,000	2,500	$100	$100	none	$42,009	29-2-05	Interim of $5	20-11-05	9½%	$146 buyers
Maatschappij tot Mijn-, Bosch-en Landbouwexploitatie in Langkat	1902	G.2,500,000	25,000	G.100	G.100	*i* T528,210 / T19,465	T35,849	31-10-04	3rd quarterly dividend of T2½ making so far T15 for '05	15-9 05	—	T210 buyers
Mondon, (E. L.) Ld.	1902	T350,000	7,000	T50	T50	none	*Dr.* T117,638	31-12-04	T5 for 1902	2-5-03	—	T25 sellers
Philippine Company, Ld.	1904	$675 000	67,500	$10	$10	none	*Dr.* P53,619	31-12-04	None	—	—	$5 buyers
Shanghai and Hongkong Dyeing and Cleaning Co., Ld.	1903	$60,000	1,200	$50	$50	none	*Dr.* $5,537	31-8-04	None	—	—	$50
Shanghai Gas Co., Ld.	1903	T800,000	16,000	T50	T50	*d* T145,000 / T108,172	T8,011	31-12-04	Interim of T3½ for 1905	26-7-05	7 %	T126 buyers
Shanghai Horse Bazaar Co., Ld.	1904	T270,000	5,400	T50	T50	T45,000	T9,751	31-12-04	T6 for 1904	17-3-05	8¼%	T72½ sellers
Shanghai Pulp and Paper Co., Ld.	—	T450,000	4,500	T100	T100	T25,000	T6,968	31-12-04	Interim of T6 for 1905	22-7-05	9 %	T151½ sales
Shanghai Sumatra Tobacco Co., Ld.	1902	T600,000	(*9*) 30,000	T20	T20	*w* T24,820 / T25,000	T1,297	31-10-04	Interim of T2	20-10-05	13¾%	T65
Shanghai Waterworks Co., Ld.	1881	£144,000	7,200	£20	£20	T170,000	T17,220	31-12-04	Interim of 15/- for 1905	27-7-05	4½%	T450 buyers
South China Morning Post, Ld.	1903	$150,000	6,000	$25	$25	none	*Dr.* $5,068	29-2-05	None	—	—	$20
Steam Laundry Co., Ld.	1902	$75,000	15,000	$5	$5	none	$1,134	31-5-05	50 cents for year ended 31-5-05	20-11-05	7 %	$7¼
Straits Ice Company, Ld.	1884	$200,000	2,000	$100	$100	$25,000	$700	31-12-04	$5 account 1905	...-2-05	—	$160 buyers
Tientsin Waterworks Co., Ld.	1901	T. T200,000	2,000	T. T100	T. T100	*e* T15,259 / T4,000	T1,012	30-4-05	Final of T4½ making T8½ for '04/5	17-6-05	7 %	T. T125
United Asbestos Oriental Agency, Ld. / Do. do (Founders')	1896	$100,000	9,900 / 100	$10 / $10	$4 / $10	$22,000	$551	31-5-05	80 cents / $19.80 for year ended 31-5-05	29-7-05	9 % / 11 %	$9 / $180
Watson (A. S.) & Co, Ld.	1886	$900,000	90,000	$10	$10	$300,000 / $25,000	$6,096	31-12-04	Final of 50 cents making $1 for '04.	29-5-05	8¼%	$12 ex d. buyers
William Powell, Ld.	1901	$150,000	15,000	$10	$10	*e* $4,500	$676	30-6-05	Interim of 50 cents for 1905	25-11-05	11 %	$11 buyers

LOANS AND DEBENTURES	AGENTS FOR THE LOAN	AMOUNT OF LOAN	PAR VALUE	OUT-STAND'G BONDS	WHEN PAYABLE	CLOSING QUOTATIONS
China Government, 7 per cent. Silver Loan 1886 E.	Hongkong & Shanghai Bkg. Cor.	T767,200	T250	1969	Mar. 31st & Sept. 30th each year until Mar. 31st, 1917.	par. (Plus accrued interest)
Hongkong Hotel Co., Ltd., 6% Mortgage Debentures of 1899‡	Hongkong & Shanghai Bkg. Cor.	$500,000	$500	⅔ all	Half yearly, June 30th and December 31st	par. (Plus accrued interest)
Shanghai & Hongkew Wharf Company, Ltd. 6% Debentures of 1902	Hongkong & Shanghai Bkg. Cor.	T543,900	T100		Half yearly, June 30th and December 31st	T97 (Plus accrued interest)
Astor House Hotel Co., Ltd. 8% Debentures of 1903	Hongkong & Shanghai Bkg. Cor.	T500,000	T100		Half yearly, January 1st and July 1st	T105 (Plus accrued interest)
Chinese Engineering & Mining Co., Ltd., 6% Debentures of 1903†		£500,000	¶	£431,960	Half yearly, June 30th and December 31st	par. (Plus accrued interest)
International Cotton Manufacturing Co., Ltd. 6% Debentures of 1901	Russo Chin. B.	T500,000	T100		Half yearly, March 31st and September 30th	par. (Plus accrued interest)

a Authorized capital $2,000,000
b Building Reserve Account.
c Capital Reserve Fund.
d Depreciation Fund.
e Equalization of Dividend Fund.
f Exchange and Investment Fluctuation Account.
g Gold Reserve Fund
h Exchange Reserve Account.
i Insurance Fund.
j Reinsurance Fund.
k Contingencies Account

l Legal Reserve Fund.
m
n Sinking Fund.
o
p Premium on New Issue.
q
r Repairs and Renewals Account.
s Silver Reserve Fund.
t
u Underwriting Suspense Account.
v

w Special Works Fund.
x Extra Reserve Fund.
y 75,000 owned by the Company.
z 6,000 shares unissued.
1 5,725 shares unissued.
2 First issue of 60,000 of which 10,411 unallotted.
3 785 shares unissued.
4 7,600 shares unissued.
5 1,616 shares unallotted.
6 842 shares unallotted.
7 14,000 shares unissued

8 399 shares unissued.
9 Only 13,000 shares issued.
* Based on last year's dividend.
‖ Only Tls. 134,000 taken up.
⅔ 268 held by the Company
¶ In certificates of £20 and £100
‡ Redeemable in 10 years, or at option of Company the Company giving 6 months' notice.
† Redeemable at par at rate of £10,000 per annum from 31st December, 1903, to 31st December, 1952
Dr. Deficit.

SINGAPORE SHARE QUOTATIONS.

Courtesy Messrs. Fraser & Co., Brokers, Singapore, December, 1905.

Name	Date of Formation	Capital	Capital Paid Up	No. of Shares	Issue Value	Paid Up	Reserve	Last Dividend	Since Last Mail Highest	Since Last Mail Lowest	Closing Quotations
Mining.									$	$	$
Bersawah Gold Mining Co., Ld.	1900	$175,000	115,000	13,500 [1]	10	10					14.00 sellers
" " " " " *Deferred.*				4,000	10	10					8.00 sellers
Bruseh Hydraulic Tin Mining Co., Ld.	1901	$600,000	600,000	60,000	10	10					10.25 sellers
Kadana Gold Mining Co., Ld.	1901	$300,000	300,000	20,000	10	10					2.00 sellers
" " " " " *Pref.*				10,000	10	10					10.00 nominal
Kechau Goldfields, Ld. *Fully paid*	1902	£30,000	16,175.7/-	6,207	1	1					3.00 sellers
" " " *Contrib.*				23,793 [2]	1	19/-					2.00 sellers
Pahang Corporation Ld.	1889	£250,000	244,306	244,306	1	1	20,000	3 per cent for year ending 30 6-02			2.00 sellers
Pahang Kabang Ld.	1890	£375,000	375,000	360,000	1	1					0.75 sellers
" " " *Pref.*				15,000	1	1					...... nom.
Queensland Raub G. M. Co., Ld. *Fully paid*	1901	£146,700	100,866	36,700	1	1					...... nom.
" " " " *Contrib.*				110,000	1	11/8					0.30 sellers
Raub Aust. Gold Ming. Co., Ld. *Fully paid*	1892	£200,000	191,250	50,000	1	1	4,873	1s. paid January, '01			3.75 nom.
" " " " *Contrib.*				150,000	1	18/10		1s. " " "	3.50	3.25	3.50 sales
Redjang Lebong Mining Co.	1898	f.2,000,000	1,800,000	20,000 [3]	100	100		22 9-10% for year ending 31-12-04	410.00	400.00	410.00 buyers
Royal Johore Tin Mining Co., Ld.	1900	$220,000	220,000	22,000	10	10		5 " for year ending 15-2-04			3.25 sellers
Sipiau Tin Co., Ld.	1899	$230,000	230,000	23,000	10	10		5 " for ½ year ending 30 6-05			5.00 sellers
The Belat Tin Mining Co., Ld.	1903	$300,000	300,000	30,000	10	10					5.00 sellers
Tronoh Mines, Ld.	1902	£160,000	149,185	160,000 [5]	1	1		5/6 paid during 1905	20.00	19.75	20.00 buyers
Duff Development Co., Ld.	1903	£400,000	350,000	400,000 [6]	1	1			8.50	8.00	8.00 sales
Rubber.											
Bukit Rajah Rubber Co.	1903	£70,000	61,000	70,000 [13]	1						£3.17s. 6d.
Balgownie Rubber Estate Ld.	1905	$200,000	100,000	20,000	10	5			8 00	7.00	$8.00 buyers
Cicely Rubber Estates Co.	1904	£12,000	10,500	6,000	1						£2.7s. 6d
" " " 5% Pref.				6,000 [14]	1						£1.15s. od.
Pataling Rubber Estate Syndicate	1903	£30,000	17,500	30,000 [15]	1	1					£5. os. od.
Ribu Planting Co. Ld.	1904	$200,000	135,000	2,000 [16]	100	100					$240.00
Sandycroft Rubber Co.	1904	$100,000	85,000	1,000 [17]	100	100			185.00	175.00	175.00 buyers
Selangor Rubber Co. Ld.	1898	£30,000	26,000	30,000 [18]	1	1					£7.15s. od.
Sione Rubber Company, Ld.	1904	$100,000	88,000	1,000 [20]	10	10					$12.00 buyers
Singapore & Johore Rubber Co. Ld.	1903	$100,000	78,750	150	100	100					$125.00 buyers
" " " " " " *Contrib.*				850	100	75					100.00 buyers
Sungei Way Rubber Co. *Fully paid*	1904	£50,000	13,920	6,920	1	1					£2.3s. od.
" " " " *Contrib.*				35,000 [19]	1	5/-					£1.8s. 9d.
Vallambrosa Rubber Co.	1904	£60,000	50,000	60,000	1						£5.os. od.
General.											
Fraser & Neave, Ld.	1898	$225,000	225,000	4,500	50	50	112,500	10 p. ct. and 2½ per cent bonus for '04			105.00 sellers
Hogan & Co., Ld.	1904	$480,200	334,800	3,348	100	100	5,000	7 per cent March 1905			42.00 sellers
H'kong and Shanghai Banking Corporation	1865	$10,000,000	10,000,000	80,000	125	125	10,000,000 [9] 8,500,000 250,000 [10]	35s. for ½ year ending 30-6-05			850.00
Howarth Erskine, Ld.	1901	$1,200,000	1,200,000	12,000	100	100	275,000	10% and 5% bon. for yr. end. 30 6-05			280.00 sellers
Maynard & Co., Ld.	1901	$34,000	34,000	3,400	10	10		20 per cent for year ending 31-10-04			23.00 sellers
Riley, Hargreaves & Co., Ld.	1899	$875,000	875,000	6,000	100	100	150,000	10 p. ct. and 2½ p. ct. bon. for year '04			200.00 sales
" " " " 7% Pref.				2,750	100	100		7 p. ct. for year 1904			115.00 buyers
Singapore Cold Storage Co., Ld.	1903	$600,000	240,000	24,000 [4]	10	10			8.75	8.50	8.75 buyers
Singapore Dispensary Ld.	1891	$30,000	30,000	600	50	50	19,000	12½ per cent for year ending 31-7-04			75.00 sellers
Straits Ice Co., Ld.	1884	$200,000	200,000	2,000	100	100	22,000	5 " interim for 1905			150.00 buyers
Straits Steam Ship Co., Ld.	1890	$500,000	421,500	5,000 [7]	100	100	400,000 169,228 [11]	5 p. ct. interim for 1905	152.50	150.00	152.50 buyers
Straits Trading Co., Ld.	1887	$3,000,000	2,500,000	300,000 [8]	10	10	700,000 1,021,395 [12]	10 p.ct. & 50cts. bon. ½ yr. end. 31-3 05			42.75 sellers
Tanjong Pagar Dock Co., Ld.	1864	$3,700,000	3,700,000	37,000	100	100	1,950,000	$20 for half year ending 31-12-04	490 00	452.00	475.00 sellers
Debentures. $											
Howarth Erskine Ld. 7 per cent ... 250,000											3 per cent prem.
Singapore Municipal 6 " ... 400,000											... nominal
" " 5 " ... 1,878,000											3 " prem. buyers
" " 4 " ... 602,300											2 " dis. nominal
Riley, Hargreaves & Co., Ld. 6 p. cent 225,000											3 " prem. buyers
Tanjong Pagar Dock Co., Ld. 6 " 250,000											2 " prem. nom.
" " " " 5 " 1,365,500											prem. sales

1 3,500 unissued.
2 13,300 "
3 2,000 "
4 36,000 "
5 10,815 unissued.
6 50,000 "
7 785 "
8 50,000 "
9 Special Gold Reserve Fund.
10 Insurance Fund.
11 Sundry Reserves.
12 Sundry Reserves.
13 9,000 unissued.
14 1,500 "
15 12,500 " Mortgage £5,000
16 650 "
17 150 unissued.
18 4,000 "
19 8,080 "
20 1,200 "

YOKOHAMA SHARE QUOTATIONS

Courtesy A. C. Hutton Potts, Share and General Broker, Yokohama, November, 1905.

STOCKS.	CAPITAL.	NO. OF SHARES.	ISSUE VALUE.	AMOUNT PAID UP.	RESERVE FUND.	AT WORKING ACCOUNT OR CARRIED FORWARD.	DATE.	LAST DIVIDEND.	FOR TERM.	CLOSING QUOTATION.
	Y.		Y.	Y.						
Brett & Co., Limited	28,000	2800	10	10			30/6/03	6%	for 1 year	7 Nominal.
Club Hotel, Limited	185,000	1850	100	100			31/3/04	7%	,, 1 year	45 Nominal.
Grand Hotel, Limited	250,000	2500	100	100		Y.2,608.34	30/6/05	6%	,, ½ year	220 Buyers.
Helm Bros., Limited	186,000	3720	50	50		Y.8,349.06	31/12/04	17½%	,, 1 year	75 Sales.
Langfeldt & Co., Limited	150,000	1500	100	100		Dr.30,174.81	30/6/05		,, ½ year	35 Buyers.
C. Nickel & Co., Limited	125,000	5000	25	25		10,572.91	31/10/04	16%	,, 1 year	32½ Sellers.
Japan Brewery Company, Limited	450,000	9000	50	50	170,000	4,781.87	31/12/04		,, 1 year	105 Buyers.
Yokohama Engine and Iron Works	130,000	2600	50	50	20,000	Y.5,935.35	31/5/05	20%	,, 1 year	85 Buyers.
Hirano Mineral Water Co., Ltd	125,000	5000	25	25				1st year		25 Sellers.
Oriental Hotel, Ltd., Old Ordinary	251,000	1490	50	50			31/8/05	12%	,, 1 year	75 Nominal.
,, ,, New ,,		1510	50	25						
,, ,, Old Preference		750	50	50	60,542.50			8%		63 Sales.
,, ,, New ,,		1250	50	25						
,, ,, Founders		80	12½	12½				Y.37		500 Sales.

DEBENTURE LOANS.	AMOUNT OF LOAN.	FACE VALUE OF DEBENTURES.	RATE OF INTEREST.	INTEREST PAYABLE.	CLOSING QUOTATION.
Japan Brewery Company, Limited	200,000.00	100.00	7%	1 April and 1 October.	108 Sales.
Brett and Company, Limited	11,500.00	100.00	7%	1 June and 1 Dec.	95 Sellers.
Yokohama United Club	250,000.00	100.00	7%	30 June and 31 Dec.	108 Sales.
C. Nickel and Company, Limited	50,000.00	100.00	8%	1 May and 1 Nov.	110 Sellers.

MANILA SHARE QUOTATIONS

Courtesy Messrs. W. A. Fitton & Co., Manila, P. I., December, 1905.

STOCK.	When Establis'd.	CAPITAL.	NO. OF SHARES.	VALUE.	PAID UP.	RESERVE.	LAST DIVIDEND AND WHEN PAID.	QUOTATION.
Banks.								
Banco Español-Filipino	1852	₱1,500,000	7,500	200.00	all	† ₱900,000	8 per cent for year ended 31st Decr. 1904	Sellers @ ₱310
Yuen Sheng Exchange & Trading Co.	1904	2,000,000	10,000	200.00	100	First year	First year	Buyers @ ₱125
Cigar Companies								
Alhambra	1898	60,000	300	200 00	all	* None	None since 1898	Buyers @ ₱165
Dos Hermanas	1905	†* 50,000	200	200.00	all	First year	First year	Nominal @ ₱200
Germinal	1899	511,817.97	720	500.00	all	₱98,878.27	4 per cent year ended 31st Dec. 1904	Buyers @ ₱550
Maria Cristina	1901	135,000	300	450.00	all	None	5 per cent for 1904; writen off ₱35,000	Sellers @ ₱450
Dock.								
Varadero (Cañacao) Slip	1884	450,000	4,500	100.00	all	†† ₱271,745 05	2½ per cent for ½ year ended Sept. 30/05	Nominal @ ₱100
Shipping.								
Compañía Marítima	1897	** 1,200,000	6,000	200 00	all	** None	None. Insurance Reserve Fund of ₱46,573.89	Sellers @ ₱150
Gold Mining & Dredging.								
Eastern Mining Co.	1904	*§ $3,000,000	3,000,000	$1	"A"	None	None	Nominal
Oriental Mining Co.	do	*† $1,500,000	1,500,000	$1	"B"	do	do	do
Philippine Mining Co.	do	*§ $3,000,000	3,000,000	$1	"C"	do	do	Sellers @ 20 cents.
Philippines Mining, Power & Development Co.	do	*§ $1,500,000	1,500,000	$1	"D"	do	do	Nominal.
Insurance.								
Yektougling Fire & Marine	1903	$2,000,000	10,000	200.00	100	₱30,000	10 % for year ended 31-12-04	Buyers @ ₱120
Sundry.								
Batan Coal Mining Co.	1902	1,000,000	5,000	200 00	all	None	None	Nominal @ ₱200
"La Concha" Button Factory	1905	75,000	750	100.00	all	None	First year	Sales @ ₱100
Fábrica de Hielo (Ice Co.)	1886	350,000	7,000	50 00	all	₱59,224.08	Interim dividend of 8 % on 6 mos. working ended June 30-05	Sellers @ ₱85
Iron Works (San Nicolás)	1900	300,000	600	500.00	all	None	Dividend for 1903, but unpaid, ₱94,520.57 at credit of P. & L. Dec. 31-04	Sellers @ ₱500; no buyers
Montserrat Bakery Co.	1905	20,000	40	500 00	all	First year	First year	Sellers @ ₱525
Philippines Co.	1904	§ 675,000	67,500	10.00	all	None	None	Buyers @ ₱3.50

† Reserve Fund ₱225,000. do voluntary ₱675,000.
* ₱2,584.83 carried to debit of P. & L. a/c 420/05.
§ Hongkong Currency.
** Reduced 1895 from ₱3,000,000 to ₱1,200,000.
*§ Gold Currency.
"A" 2,115 000 shares issued.
"B" 1,200,000 ,, ,,
"C" 2,500,000 shares issued.
"D" 1,000,000 ,, ,,
†† Reserve. Fund ₱106,077.17. do voluntary ₱165,667.86.
§§ ₱14,083.03 carried to debit of new account on 2 years' working.
†* Authorized to issue ₱50,000 Preference Shares @ 8%

DEPARTMENT OF COMMERCE AND POLICE.

BUREAU OF PORT WORKS.

MANILA STEEL WHARVES.

ADVERTISEMENT.

BUREAU OF PORT WORKS,
Manila, P. I., December 20, 1905.

Sealed proposals for the construction of TWO STEEL WHARVES in Manila Harbor will be received until 11 o'clock a. m., April 5, 1906, and then publicly opened.

Information furnished on application to this office or to the Bureau of Insular Affairs, Washington, D. C.

Plans may be seen at the above offices and also at the United States Engineer offices at Chicago, Ill., and San Francisco, Cal., and at the offices of "The Engineering News" and "The Engineering Record" at New York.

W. L. FISK,
Lieut. Col., Corps of Engineers, U. S. A.,
Director of Port Works, Philippine Islands.

INSTRUCTIONS TO BIDDERS.

1. The contract, together with the plans and specifications, which form a part of it, which the bidder and the guarantors promise to enter into, may be obtained at this office or at the office of the Bureau of Insular Affairs, Washington, D. C.

Parties making bids are understood as accepting the terms and conditions contained in the contract.

2. The quantities stated herein, although estimated with as much accuracy as is possible, are only approximate, and the bidders, or their authorized agents, are expected to satisfy themselves by personal examination of the location of the proposed work, and by such other means as they may prefer, as to the accuracy of the estimated quantities and the difficulties attending the execution of the work, including the uncertainty of the weather and all other contingencies. They shall not at any time after the submission of a proposal lay claim against the Government of the Philippine Islands on account of any excess or deficiency, absolute or relative, in the estimate.

3. All proposals and guaranties must be made in triplicate upon the printed forms and the guaranty attached to each copy of the proposal.

One copy each of the advertisement, instructions for bidders, and specifications must be securely attached to each copy of the proposal and be considered as comprising a part of it.

Copies of the necessary forms may be had upon application in person or by mail to this office or to the Bureau of Insular Affairs, Washington, D. C.

4. Proposals and accompanying documents shall be securely sealed in an envelope plainly marked "Proposal for the construction of two steel wharves at Manila, P, I.," then placed in an outer envelope and addressed to "The Director of Port Works, Manila, P. I."

Proposals must be in the possession of the Director of Port Works before the hour appointed for opening the bids.

5. The guaranty accompanying each proposal must be signed by a surety company authorized by the Philippine Commission, or by two responsible guarantors to be certified as good and sufficient guarantors by a judge or clerk of a United States court, United States commissioner, or judge or clerk of any court of record in the Philippine Islands, with seal of said court attached.

6. A firm, as such, will not be accepted as surety, nor a partner for a copartner or firm of which he is a member.

Stockholders who are not officers of a corporation may be accepted as sureties for such corporations. Sureties, if individuals, must be citizens of the United States or residents of the Philippine Islands owing allegiance to the United States, or subjects or citizens of other Governments residing in the Philippine Islands, having sufficient property therein subject to execution to meet the obligation of the bond

Any corporation incorporated under the laws of the United States or any State thereof authorized to become surety upon official bonds under the Acts of the Philippine Commission may be accepted as surety.

7. When the principal, a guarantor, or a surety is an individual, his signature to a guaranty or bond shall have affixed to it an adhesive seal. Corporate seals will be affixed by corporations, whether principals or sureties.

All signatures to proposals, guaranties, contracts, and bonds should be written out in full, and each signature to guaranties, contracts, and bonds should be attested by at least one witness, and, when practicable, by a separate witness to each signature.

8. Each guarantor will justify in the sum of forty thousand pesos, Philippine currency.

9. A proposal by a person who affixes to his signature the word "president," "secretary," "agent," or other designation, without disclosing his principal, is the proposal of the individual. That by a corporation should be signed with the name of the corporation, followed by the signature of the president, secretary, or other person authorized to bind it in the matter, who must file evidence of his authority to do so. That by a firm should be signed with the firm name, either by a member thereof or by its agent, giving names of all members of the firm.

Anyone signing the proposal as agent of another or others must file with it legal evidence of his authority to bind the firm.

10. The place of residence of every bidder and post-office address, with county and State or town and province, must be given after his signature.

11. All prices must be written as well as expressed in figures, and will be expressed in Philippine currency.

12. Proposals must be prepared without assistance from any person employed in or belonging to the military service of the United States or employed by the Bureau of Port Works, Manila, P. I.

13. All blank spaces in the proposal and bond must be filled in, and no changes shall be made in the phraseology of the proposal or addition to the items mentioned herein. Nor shall any conditions, limitations, or provisions be added thereto.

14. Alterations, by erasure or by interlineation, in filling in the proposal must be explained or noted over the signature of the bidder.

15. No bidder will be informed, directly or indirectly, of the name of any person intending to bid or not to bid, or to whom information in respect to proposals may have been given.

16. If a bidder wishes to withdraw his proposal, he may do so before the time fixed for the opening without prejudice to himself, by communicating his purpose in writing to the officer who holds it, and, when reached, it will be handed to him or his authorized agent unread.

17. Reasonable grounds for supposing that any bidder is interested in more than one bid for the same item will cause the rejection of all bids in which he is interested.

18. No proposals received after the time set for opening of proposals will be considered.

19. Failure to comply with any of the conditions named herein will be sufficient ground for the rejection of the proposal.

20. The Government of the Philippine Islands reserves the right to reject any or all proposals and to waive any informality in the proposals received; also to disregard the proposal of any failing bidder or contractor known as such to the Director of Port Works.

21. The bidder to whom award is made will be required to enter into written contract with the Government of the Philippine Islands, with good and approved security in an amount of ten per centum of the amount of his bid, within twenty days after receiving notification of the acceptance of his proposal.

Blank forms of the contract may be seen at this office.

22. The sureties, if individuals, are to make and subscribe affidavits of justification on the back of the bond to the contract, and they must justify in an amount which shall aggregate double the amount of the penal sum named on the bond.

23. Bidders are invited to be present at the opening of the bids.

THE FAR EASTERN REVIEW

COMMERCE ❀ ENGINEERING ❀ FINANCE

VOL. II. MANILA, P. I., AND SHANGHAI, JANUARY, 1906. No. 8.

CONSTRUCTION OF THE CANTON-SAM SHUI BRANCH OF THE CANTON-HANKOW RAILWAY

(By C. W. MEAD, C. E., Late Engineer-in-Chief of the Canton-Hankow Railway)

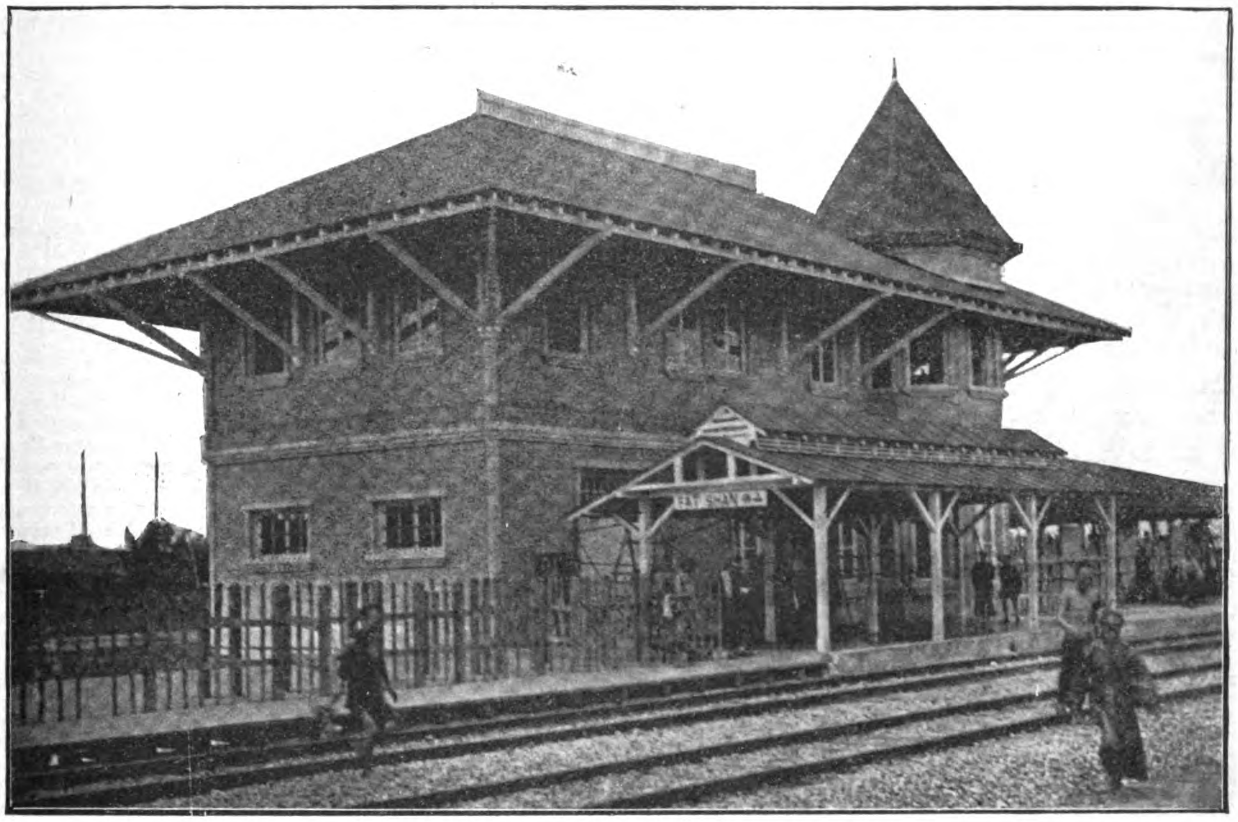
The main line of the Canton-Hankow Railway will connect Canton, the great S. China metropolis, with Hankow, the most important of all interior Chinese cities.

Leaving Canton the line runs N. up the Pearl River about 30 ms. where it strikes across to the Pei River following the valley about 100 ms. to Shao Chou, thence up the Wei River to near its headwaters, where it crosses a range of mountains onto the headwaters of the Lei River which flows N. into the Siang and Yangtsze; then following the Lei, Siang and Yangtsze valleys to Wuchang on the S. side of the Yangtsze opposite Hankow. The line traverses a country rich in both agricultural and mineral resources, and thickly settled except in the mountainous districts and some of the flooded sections of the Yangtsze and Siang River valleys.

Approximately the main line is 750 ms. in length, and there are about 150 ms. of branches, of which the most important is the Canton-Sam Shui line which has been constructed and in operation for 2 yrs. An important feeder leading from Ping Hsiang to Chu Chou, about 60 ms., has been constructed, and is now in operation. This will bring the products of the Ping Hsiang coal mines, owned and operated by H. E. Sheng Kung Pao, to Chu Chou, where they will be transhipped to the Han Yang Iron Works also owned and operated by Sheng.

SURVEY OF THE LINE.—A reconnoissance survey was run over the entire line by Wm. Barclay Parsons in 1898-9. Since then preliminary surveys have been run from Canton N. nearly 150 ms. and 100 ms. of same permanently located. On the N. end preliminary and location lines have been run from Yo Chow, at the mouth of the Siang River, to Chu Chou, the point of intersection with the Ping Hsiang branch. This is a distance of 150 ms., and is probably the portion which will be first constructed. This section, in connection with the Ping Hsiang-Chu Chou branch will deliver coal and coke to the comparatively deep water navigation of the Yangtsze whence it will be distributed along the lower Yangtsze by boat.

The Canton-Sam Shui branch for the first 14 ms. out from Canton runs over a flat country of alluvial formation and entirely covered with rice fields, cane, and vegetable gardens. This country is cut by many tidal streams some of them being 125 ft. wide and very deep. Beyond Chai Bin the country assumes a broken aspect, and many low ridges separate the various valleys across which the line runs. These ridges are mostly of soft sandstone, only one reef of hard rock being found, and that was a black basalt at Wong Ting See, 3 ms. E. of Sai Nam. The entire country except the ridges would be subject to overflow except for dykes which are about 7 ft. near Canton, while at Sam Shui the main dyke is 30 ft. high. All the streams crossed are navigable for some kind of craft at some time during the year, and this fact forced an ascending and descending grade at the principal crossings.



FAT SHAN STATION, THE ONLY PERMANENT STATION ON THE CANTON-SAM SHUI DIVISION

The first 10 ms. of this branch to Fatshan is double-tracked and the last 20 ms. is single-tracked. The double-tracked portion has 13 ft. centers and 31 ft. roadbed; is laid with 75-lb. steel rails on steel ties and ballasted with broken stone on the Canton end and sand on the Fatshan end. The single-tracked line has a roadbed 18 ft. wide, is laid with the same weight rails upon Japanese oak ties, and is entirely sand ballasted.

The alignment is very good having a maximum curve of 4° and none over 3^{0} between Canton and Fatshan, except the 6^{0} curve of $10^{0}3$ at Fasthan, which was put in order to place the line close to the town. The

(Continued on page 202.)

THE FAR EASTERN REVIEW

GEO. BRONSON REA, M. E.

PUBLISHER AND EDITOR

COMMERCE :: ENGINEERING :: FINANCE

A MONTHLY REVIEW OF FAR EASTERN TRADE, FINANCE, AND ENGINEERING. DEDICATED TO THE INDUSTRIAL DEVELOPMENT AND ADVANCEMENT OF TRADE IN THE PHILIPPINES AND FAR EASTERN COUNTRIES.

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ENTERED AT POST OFFICE, MANILA, P. I., AS SECOND CLASS MATTER.

MANILA AND SHANGHAI, JANUARY, 1906

WATERWORKS AND SEWER SYSTEMS FOR MANILA

Proposals for the construction of a gravity water supply and a sewer system for the City of Manila have been opened, and the contracts for these vastly important works let by the Municipal Board, since the beginning of the new year. This is a very good beginning of 1906 in the matter of progress, by the municipality. We believe it places us in the lead as regards city improvements, of all municipalities in the Far East. However, it is best that we wear our laurels with becoming modesty because our neighbors over the way are beginning to take our works out here very seriously just now, and it would not be policy on our part to dampen their interest in us by "pointing with pride" to our public spirit.

Four million dollars gold have been set aside by the municipality for public improvements, most of which will be spent on the new water and sewer systems. The construction of the water system goes to the Atlantic, Gulf and Pacific Company and the Matson, Lord and Belser Company, while the Atlantic, Gulf and Pacific Company will build the new sewer system. Both of these concerns have a record for thorough-going engineering and construction methods, so it is safe to predict that they will fulfill their contracts with the city promptly and to the letter.

Considerable interest centered in the letting of these contracts. Competition was keen, and throughout the whole proceeding the master-spirit of the office of the Chief Engineer, Department of Waterworks and Sewer Construction, dominated. To Mr. J. F. Case, the chief of the department, great credit is due from the city for the care he has exercised in the preparation of the plans and specifications and the original estimates, and the watchful attitude he has maintained over the interests of the city. He has been assisted in his preparatory work by a corps of able co-workers, to whose thoroughness is in a measure attributed the efficiency of Mr. Case's office. On other pages of this issue will be found details of the proposals.

CHINESE SITUATION AND BOYCOTT

It is indeed time that the Government at Washington were changing its policy with reference to China. Indications point to the application of the "mailed fist" at a very early date, and unless the signs fail the Americans will soon take the initiative in a demonstration against China which must result in great good to all foreign interests there. We do not believe in bombastic utterances, nor sensationalism; but we must insist upon fair play for the foreigners whose circumstances have placed them among the Chinese.

Our policy towards the Celestials has been altogether too magnanimous. Like most of the other Orientals, kindness and the spirit of friendly liberality towards the Chinese have fanned into a flame the subdued hatred of the yellow people. Now that all the damage has been done, that the Chinese have paralyzed American trade and industry in their own country, up pops Washington with a specter which has the appearance from this far-off vistage of war. We are opposed to war, but if it must come to teach the Chinese the lesson which they should have been taught during the Boxer uprising, then the sooner it comes, and the quicker the lesson is taught, the better for all concerned. Our policy which practically forced the other Powers to maintain the integrity of China, our expressed intention to return the indemnity we exacted from Peking as a result of the Boxer movement to China for educational purposes, and our other near-sighted diplomatic deals to protect "oppressed China" against the ravages of "spoilsters," have brought down upon us the contempt and hatred of the Celestials. And we are inclined to the belief that this policy is largely responsible for the boycott movement and the general anti-foreign campaign which promises to throw the entire Chinese nation into a seething furnace of violence during the New Year's season now close at hand.

Chinese contempt for Americans is not confined to China itself. We have lately been getting large portions of the article right here in Manila, where the Chinese have received every protection that our laws could give them. The merchants have become so overbearing and curlish that it is well-nigh impossible to deal with them. Everywhere you meet the Chinaman, be he merchant prince or coolie, he glowers at you with eyes that fire bolts of hate and fury into your face. He is doing everything in his power to menace American trade right here in these Islands, and he should come in for his share of the lesson Washington threatens to teach his kinsmen in China.

While war may be necessary to settle the Chinese question, we would like to see another remedy tried first. We would like to see Washington send an ultimatum to the Peking Government to the effect that if the anti-foreign movement is not immediately suppressed and kept down, if damages are not immediately paid to the American concerns that have suffered loss on account of the boycott, and if the Chinese do not conduct themselves towards Americans with respect and a spirit of absolute fairness in business,—if these requirements are not complied with immediately, and earnestly adhered to in the future, every Chinaman who is prospering and living on American soil will be summarily deported to the home country. We believe such an ultimatum would "change the face" of the Chinese most effectually, and have a tendency to keep it "changed" for some time to come.

We can do without the Chinese very nicely out here in the Philippines. He is absolutely of no service to the Islands. His sole game is to rake in all the money he can get hold of, spend only enough to keep himself from starving and his body from becoming entirely nude, and horde the surplus. Enterprise and public spirit are not one of his characteristics, nor does he care for the future of the Islands. He is living only in the present—for himself—and for the sake of the money he can bury. With the outcropping of the Chinese character he looks to us more like a menace to the progress of the Philippines at the present time than he has ever looked before. Choosing between the Filipino and the Chinese, we take the liberty of saying that for ours we will have the Filipino every time.

PHILIPPINE MINING LAWS

On other pages of this issue of THE REVIEW appears a strong appeal to the Congress at Washington for a modification of the mining laws of the Philippine Islands, by Mr. H. D. McCaskey, who is at the head of that division of the government under which the mineralogy of the Islands is being developed. Mr. McCaskey's qualifications and his long official service in the archipelago eminently qualify him to speak for the miners on this question. He makes a very conservative and at the same time conclusive argument for more liberal laws to promote the mining industry, and we hope that our legislators in the homeland will read his petition carefully and thoughtfully to the end that they may receive his recommendations favorably, and act accordingly.

BRITISH NORTH BORNEO

The last issue of *The British North Borneo Herald*, received at our exchange table, shows that "Charter Day"—the twenty-fourth anniversary of the incorporation by royal charter of the British North Borneo Company—passed by recently. The paper in question is the official organ of the British North Borneo Company, and in indulging in retrospect in its "Charter Day" issue *The Herald* says that this "retrospect appears to us to be one which must be eminently satisfactory to the shareholders as well as to those original members of the Court of Directors—few enough in number now—who have borne the burden and heat of the day from the commencement of operations." It is the belief of *The Herald* that the record of progress in this state is one of which any country would be proud; so, because of the close proximity of British North Borneo with the Philippine Islands, and the cordial and increasing commercial relations which exist between that state and the Sulu Archipelago,—which, we believe, is a tie that makes mutual progression of general interest and importance,—we feel called on to review the march of progress in Borneo even as seen through the eyes of the official organ of the British North Borneo Company.

The state has been administered for less than 25 yrs., the whole fabric of administration having been built up; prosperous towns have arisen where none existed; wharves have been constructed at each of the five principal ports; a telegraph line has been run right across the state, with necessary branches; a railway 120 ms. in length has been pushed through the pathless jungle and engineered over morasses, over rushing streams and up the most difficult Padas Gorge; a revenue raised which at the close of 1905 was estimated at $1,020,000, and an import and export trade fostered of the combined total in 1904 of $7,168,000, of which the

exports were over $4,000,000 and the imports nearly $3,000,000. The rapidity of progress can better be appreciated when it is cited that the revenue for the 15 mos.' administration by the provisional association prior to the granting of the royal charter was but £6,360—say $100,000 at the then rate of exchange; and that, during the succeeding 18 mos.' administration by the new chartered company up to the end of 1883, the total reached £24,801—say $360,000 or $240,000 *per annum;* while between 1900 and 1904, the actual revenue received rose from $587,000 to nearly $929,000, showing in the former year a surplus over revenue expenditure of $189,000 and in the latter year a surplus of nearly $375,000. The estimated surplus in 1905 is estimated at $429,000.

The claim is made by *The Herald* that no other British colony or protected state within range of British North Borneo—making special reference to the Straits Settlements and the Federated Malay States—can show a better comparative record of progress. It asks:—

"What was the revenue of Penang, for instance, after the first 24 yrs. of administration? what that of Singapore even, with its wonderful commercial position? and what that of Sarawak?"

Perak and Selangor are cut out of the comparison by *The Herald* since they were already in possession of ascertained mining industries when the British residential system was introduced, and British North Borneo had no ascertained industry at all.

That the administration of the affairs of British North Borneo does not bear hardly upon the governed is shown by the increase in population and in immigrants; and in the continued formation and development of tobacco, mining, rubber and other industrial companies which mostly submit very satisfactory results in reports to their head offices in London. Licenses and customs are items of revenue which afford a true index to the progress of countries like Borneo, and here are the figures which *The Herald* presents:—In 1900 their combined total was $439,090; in 1904, it was $654,000; and in 1905, it is estimated at $728,000.

From all of which we are gratified to give due credit to the wisdom and foresight of the British North Borneo Company's administration in this state. We believe that the policy which has been pursued for 24 yrs. down there could be emulated with benefit to ourselves, and without partiality we venture that the progress of the Moro Province may be attributed to some extent to its close geographical proximity with British North Borneo, which makes it possible for the administrative influence at Sandakan to be felt at Zamboanga.

MANILA POSTOFFICE

In the past month an attempt has been made through the columns of a Manila paper to discredit the postal service of this city on account of what appears to have been a personal grievance—illy conceived—against a division of the postoffice, augmented by an error on the part of someone which delayed the removal of mail from a vessel which arrived from Hongkong.

While we do not intend to revive a controversy which, in our opinion, should never have occurred, we are constrained to say a good word for the management of the postal service of the Philippines, with particular reference to the Manila postoffice.

For nearly 2 yrs. our office has been in close business relation with nearly every division of the postoffice, and we have only words of the highest praise for the general conduct of this service. Without exception the officials and their subordinates have been courteous and obliging, even to the extent of exceeding on their own responsibility the most liberal interpretation of established regulations. With rare exceptions arriving mails have been distributed and delivered with surprising despatch, and where the public could be accommodated the postoffice forces have worked overtime, and on Sundays and legal holidays. The most trivial complaint has been investigated carefully, and we are convinced that the sole aim of everybody connected with this branch of the public service has always been, and is at the present, to maintain, and if possible increase, the efficiency of the Bureau of Posts. We claim for Manila, without fear of contradiction, the best postal service in the Orient; certainly far more efficient than that which was given to the community before American occupation.

JAPAN'S INVASION OF SOUTH AMERICAN MARKETS

According to some journals, Japan and Brazil are getting together for the purpose of bettering trade relations. There is talk of a large number of Japanese emigrating to Brazil. A French writer recited certain facts in *The Bulletin of the Commercial Geographical Society of Paris,* to prove that the movement is more than a tentative one. These show that Japan is bound to develop trade with Brazil, as it is trying to do with Peru and other countries of South America.

The writer cited intimates that Japan is bound to be on hand when the Panama Canal is cut. One of the largest of Japan's steamship companies has inaugurated monthly voyages between Japan, Callao, and all of the important South American ports. Agencies for these boats have been opened an Rio de Janeiro and Santos. In these cities Japanese agents are at work studying the conditions with a view to settling the question of colonization. For a long time Brazil has been seriously concerned with the problem of Japanese colonization.

The State of San Paulo has paid most attention to the problem, going so far in its interest as to send its agents to Japan for the purpose of studying the Japanese people at home. Everything seems to favor a trial. The Brazilians are said to have offered the Japanese free transportation, a period of rest upon arrival, and dwelling houses. The Japanese were, to work for a fairly decent wage a certain number of hours each day. The remainder of the time was to be at their own disposal. At first the Japanese were dazzled, but reflection taught them that a people who would be willing to defray the cost of transportation to far-off foreign lands could be cajoled or coerced into paying better wages than those offered. The mistake made by the Brazilians was in offering as wages maximum prices—that is, the prices they had agreed among themselves as the highest possible to be paid.

After long deliberation, no one being willing to yield, the discussion was dropped. This all happened just as Japan and Great Britain signed their new treaty. It is thought that the Brazilians expect to find in the Japanese virtues that by repute belong to the Chinese. At any rate the revival of the immigration efforts only goes to prove the allegation that they had been well under way, and, further, that Japan is favoring them at the present time. In the event that the Orient pours its millions into South and Central America, the problem connected with the wealth of the Tropics will be in a fair way to successful solution.

TRANSPORTATION IN CHINA

A consular report recently published at Washington deals with transportation conditions in China and describes and emphasizes the value of that country's waterways, showing, also, what is possible and probable in railway building. From this report we are privileged to gather some most interesting facts.

The practical deadlock in the construction of railways in China, which has existed for the past year or so, is found to be just as marked as ever. As a matter of fact the war had very little to do with the general railway movement of the empire. The continued delay is due to Chinese rather than extraneous reasons, and probably represents an economic movement which is of the utmost importance to foreign business. The Chinese people—that is to say, the gentry—have no appreciation of the development of a country by railroads, although the need of some railways in China is appreciated by them. They seem to feel that in many ways and in most places there is no need of any change. And for heavy freights in some parts of the empire this is really the case.

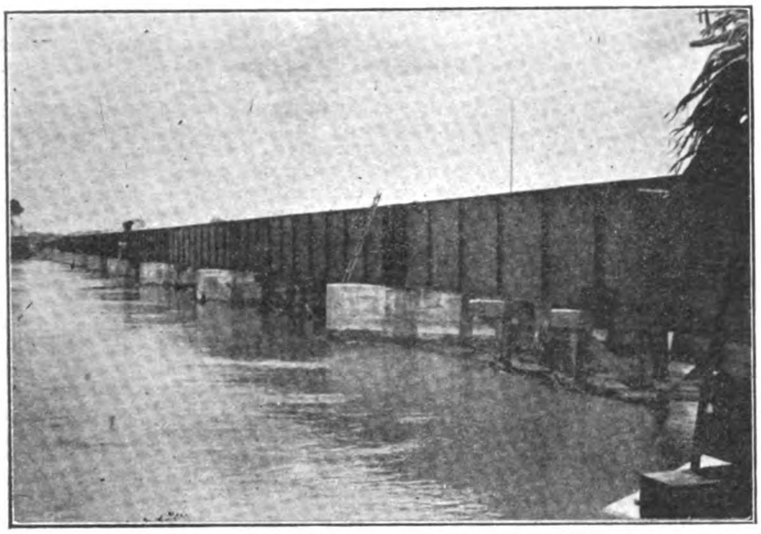
The quantity of goods transported by Chinese coolies, and in the northern portion of the empire by carts, is beyond the belief of those who have not had occasion to investigate the subject. In the interior of the greater portion of the country coolies and canals carry all freights, and what this means can be understood to a fair degree perhaps when it is realized that there is practically no railroad service at all in the most populous and richest portions of an empire containing 400,000,000 or more of people. In most of the empire there are no highways worthy of the name. In the northern provinces the traffic in carts of a rough sort dominates the entire movement of goods, in the districts concerned, to the seaboard. Where waterways are frozen a great portion of the year this is of necessity the case.

It is in that portion of the empire where waterways are frozen much of the year that the first hold of the railroads has come. The greater portion of the empire is served by waterways where it is served at all. Along the China Coast there is a series of navigable rivers coming down from the interior, a series of which has few equals, all things considered, in all the world. From the Yalu and Pei-Ho, at the N. to West River, passing through Canton, in the S., these rivers seem to be formed to reach inland from the coast, connecting not only the coast cities with the interior cities, but the interior cities with each other by way of the coast as well. About midway between N. and S., the great Yangtsze reaches far into the interior, navigable almost to the western border of the empire, and by its tributaries offering still further communication with interior points. The rapids of the Yangtsze have been and still are a drawback to the development of all the upper part of the Yangtsze Valley. But these rapids probably can be subdued at an expenditure ridiculously small, compared with the enormous benefits to follow. That this will be done in the near future, and that steam navigation, regular and safe, with Chunking and the upper river will be established and maintained, is beyond question.

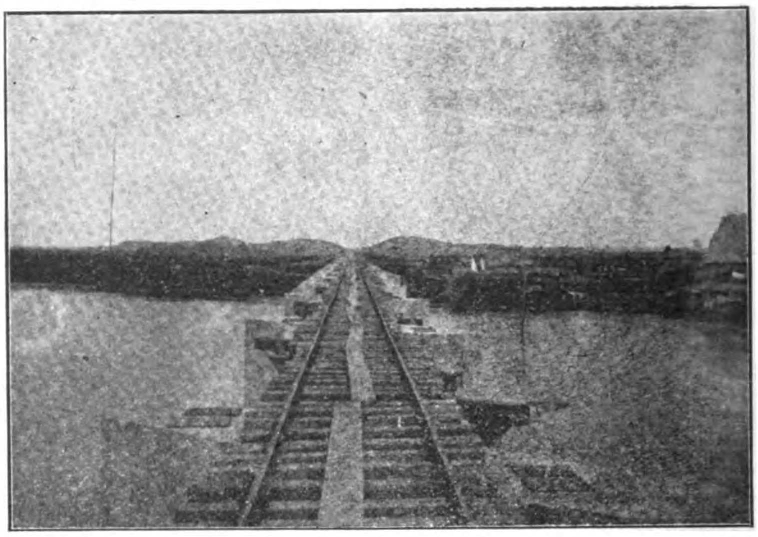
The most interesting, and in some respects the most important feature of the waterway system in China, however, is the canal system. Running more or less parallel to the seacoast from Hangchow to Peking, through a very rich portion of the empire, certainly the most important portion, commercially, at the present time, is the Grand or Imperial Canal region. Connecting with this, at either hand, are smaller canals. These, in turn, connect with still smaller waterways, and still farther are smaller streams, until the whole Yangtsze and Yellow River plains are a vast net-work of waterways, designed originally for irrigation very largely, but used at the present time both for irrigation and transportation. To become conversant with Chinese commercial conditions, one must thoroughly understand this system of streams and canals. It is a characteristic part of the life of the Chinese people. There will be no system of railroads to supplant it in its close relation to life here, and any commercial system or theory which disregards it will fall short of success. The rivers and waterways of the empire will be the basis for heavy transportation and traffic for years to come, and the railroad system (for which there is hope) will not supplant but merely supplement them.

What an adequate railroad system would do for China cannot accurately be measured, so great are the possibilities. But there is not the bright prospect in railroad affairs in China that there ought to be, and the indications are that there will be even worse conditions in the near future than those now obtaining. There are in operation about 2,200 ms. of railroads in China; there are in the course of construction possibly 1,500 ms. more. Concessions for railroads have been granted all over the empire. It may be said that every railroad China needs has been planned twice over, and concessions for many of them are already granted. But this does not mean that the lines are being constructed, or that they will be constructed. The moment that any serious work on a railroad is commenced, under a concession held by foreigners, there is opposition, delay and finally nothing accomplished.

The general prospect for any change in the general transportation facilities of the empire in the near future is not very encouraging. It hinges on political and social changes which will not come very soon.



SAINAM BRIDGE, SHOWING PIER CONSTRUCTION



SAINAM BRIDGE; TRACK LAID OVER ON FALSE WORK

CONSTRUCTION OF THE CANTON-SAM SHUI BRANCH OF THE CANTON-HANKOW RAILWAY

(Continued from page 199)

maximum grade is 5 10 of 1 per cent and is used at five stream crossings between Canton and Fatshan and several times over low ridges between Fatshan and Sam Shui.

ENGINEERING DIFFICULTIES.—The only engineering difficulties on this division are the bridge foundations, which were made by first driving piles to a depth sufficient to give a bearing power of 12 tons on each pile. The required resistance to penetration was usually obtained in a strata of coarse quartz sand which lay from 30 to 50 ft. below the surface and varied from 3 to 7 ft. in thickness. In some cases a bearing power of only 6 or 7 tons could be obtained, in which cases special designs were made by putting in more piles and covering more ground. The piles were cut off below water-level, all the silt taken out from between them, and coarse stones were rammed in to within 2 ft. of their tops upon which concrete was built to sub-grade and granite bridge seats put on. The spans are of 10, 15, 20, and 30 ft. deck girders, and 40 and 60 ft. through girders. There is one bridge across the Sainam River with 96-ft. spans and three other bridges on the line 120 ft. long, which have one 60-ft. and two 30-ft. girders. Several box and arched concrete culverts were used, and arched road crossings below grade. Short spans were used for economical reasons as steel laid down at the bridge sites was costly, while the cost of foundations was low owing to cheap material and labor. The ease in handling short spans with unskilled labor was a large factor, and all these reasons tended to an opposite economic condition to that found in Europe and America.

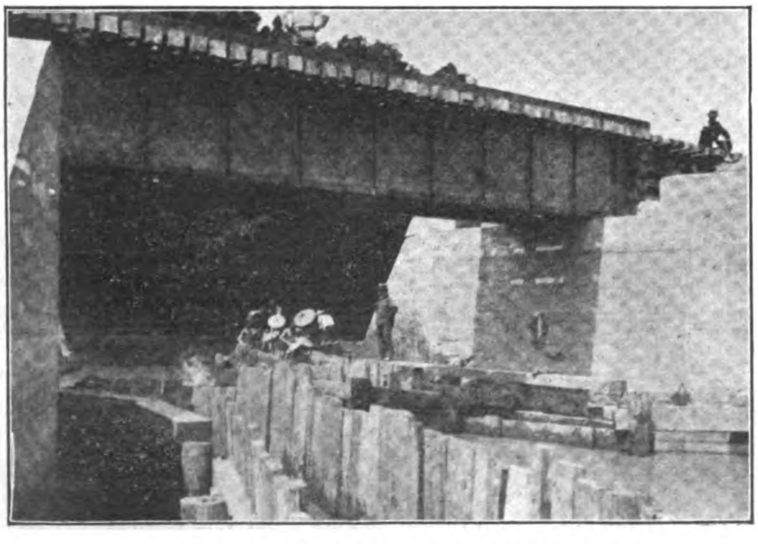
Only one permanent station was constructed and that at Fatshan. All others are small and temporary and put in at an average distance of 2 ms., thus giving the traffic an opportunity to develop and decide where stations were necessary. The Fatshan Station is a fairly handsome 2-story structure built of brick and wood and the cost was about $15,000 Hongkong currency.

A blacksmith and repair shop was established at Shek Wei Tong, which is complete enough to make all necessary assembling of rolling stock for the division and keep it in repair. This shop is entirely operated by Chinese workmen.

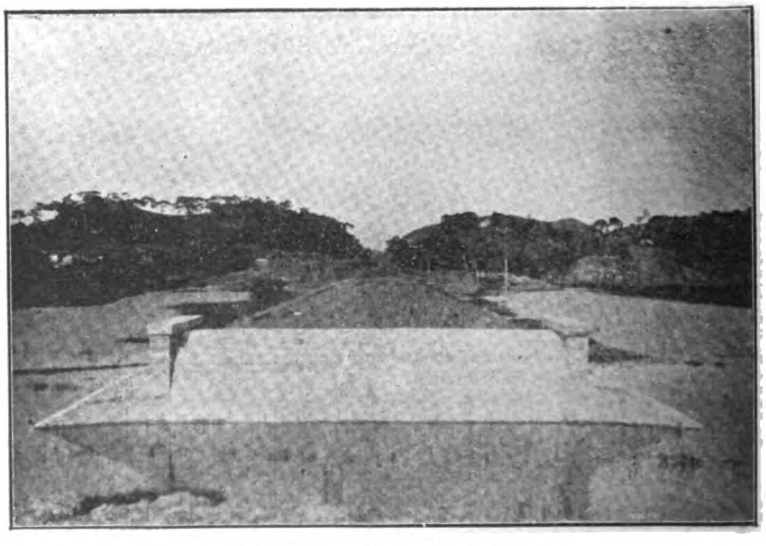
SUPERSTITION AND IGNORANCE MENACE CONSTRUCTION.—Many difficulties were encountered in the construction of this branch mainly on account of the superstition of the people and the profound ignorance of the workmen, most of them never even having heard of a railway much less seen one, but with the blandlike simplicity of the Chinese there was no trouble in finding wouldbe contractors who would undertake any kind of a contract for any price and agree to complete it in any time required. Experience taught the engineers that the Chinese were able to contract for earth embankments and shallow cuts, while all other work was more economically performed by using foreign foremen or letting the work to foreign contractors. At best it was slow and costly as all the workmen had to be first taught, and there were no experienced foremen or reliable foreign contractors available. The building of this line was not only a school to the Chinese employed but it taught the engineers in charge how to take advantage of the peculiar conditions in China. That this schooling was valuable was clearly proven by the greatly reduced cost of the work performed on the main line after the completion of the branch.

As an illustration of the difficulties encountered on account of the ignorance and superstitions of the people, when the line was permanently located to Sam Shui a strong and vigorous protest was entered by the inhabitants of a little village called Too Yuen Kong on account of a 15-ft cut through a small hill. In this protest the people said that a tiger lived in that hill and it was the guardian of the village; that, if the railway cut through it, the tiger would escape and go to the mountains and the village would go to the eternal bowwows, the poeple would die; the cocks would not crow, and the dogs would cease to speak. The engineers met the chief men of the village on the ground and discussed the matter but could bring no arguments to bear to get their consent to the location of the line, and the result was that the location was changed at this point.

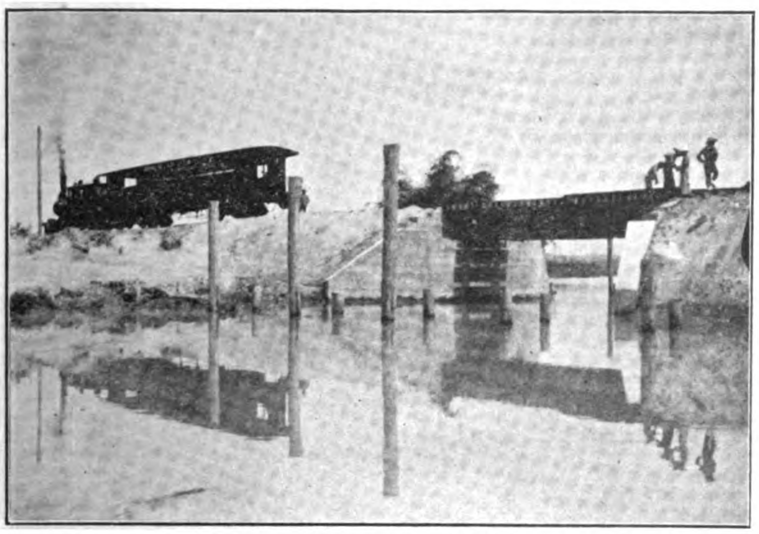
METHODS AND COST OF CONSTRUCTION.—Many unique methods of construction were used, some original and others older than the hills to the Chinese, although new to foreigners. In the construction of embankments the Chinese were fairly adept for the reason that they had been constructing dykes for hundreds of years. They entirely ignored the use of wheelbarrows or all other methods of transportation except baskets. They were finally broken in to use wheelbarrows and small cars carrying about 1 cub. yd. For the transportation of materials less than 100-ft., baskets were found to be more economical, while for moderately short hauls the wheelbarrow proved the best. The cars were used in long hauls of 1000 to



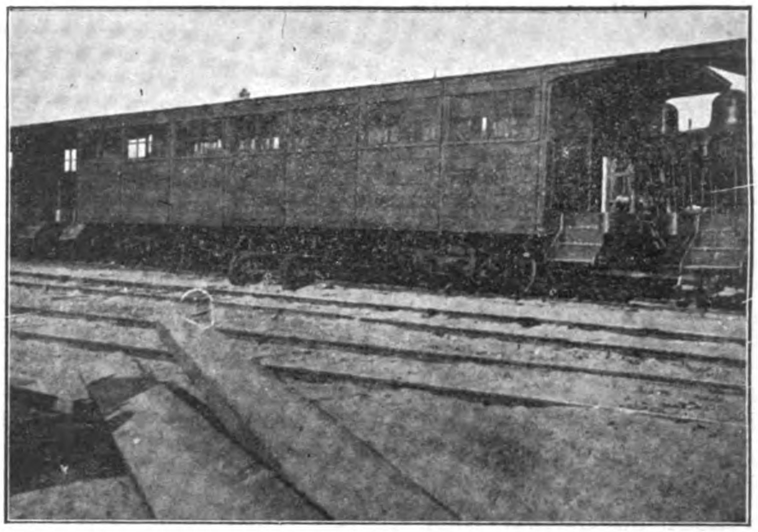
30-FT. DECK GIRDER, SHOWING COFFERDAM



STANDARD 12-FT. ARCHED BRIDGE



30-FT. DECK GIRDER; CHIEF ENGINEER'S CAR

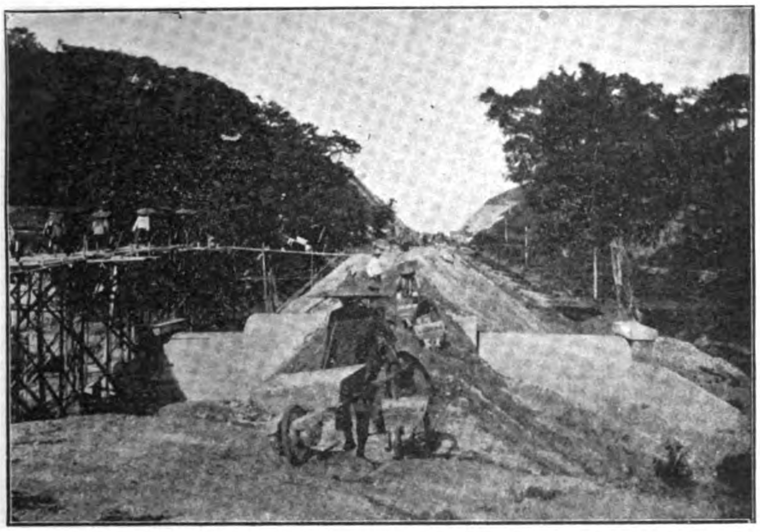


SECOND-CLASS PASSENGER COACH

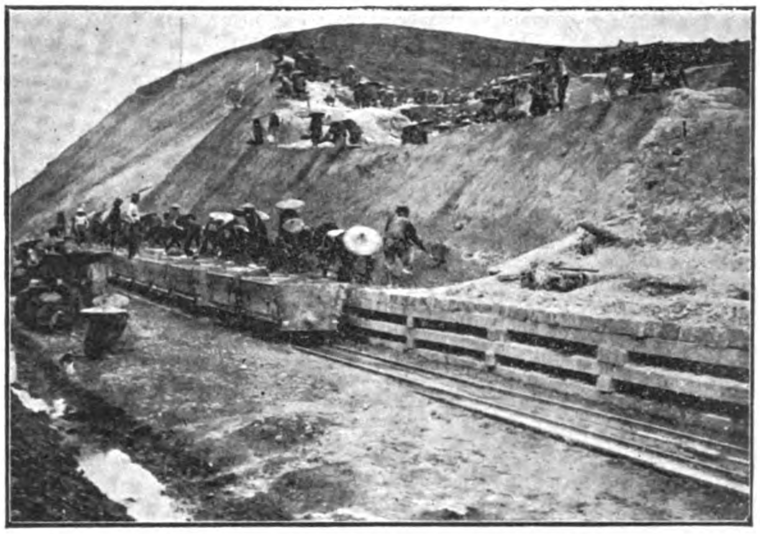
2000 ft., and at a distance of 2000 ft., ordinarily soft-cut material could be picked, shoveled into the cars and delivered into an embankment 2000 ft. away for from 20 to 25 tcs., Mexican, per yd. Cost of overhaul by cars was about ½ c. per cub. yd. per 100-ft., while overhaul by basket or wheelbarrow was from 1 to 2 cts. per yd. The cost of embankments to a height of 4 or 5 ft., through rice fields, was from 10 to 12 cts. per cub. yd., the cost increasing as to height of embankment, coming up to 18 or 20 cts. in some of the highest. These prices obtained on the main line after the completion of the branch. The cost of rock excavation run from 60 cts. on the softer sandstones to $1.40 on hard trap per cub. yd.

Piles cost from 25 to 35 cts. per lin. ft. according as they were 25 or 50 ft. long. The piles used were Chinese pine brought many hundreds of ms. from the headwaters of the North and West Rivers. This wood is very poor—something like basswood—but is the best available and answers fairly well for pile foundations, but great care has to be used in driving to avoid breaking. A diameter of from 14 to 16 ins. at the butt is about the extreme size that is obtainable. The driving cost about $2 each. At the larger bridges steam drivers were used and at the smaller ones hand drivers. The hand drivers were handmade and operated with a whim. One of the drivers was fitted with a treadmill arrangement for raising the hammer, and it was found that the same number of coolies would drive twice as many piles by this method in a day as by hand, and this manner of working appealed to them more strongly than raising the hammer by turning a crank.

(Continued on page 224.)

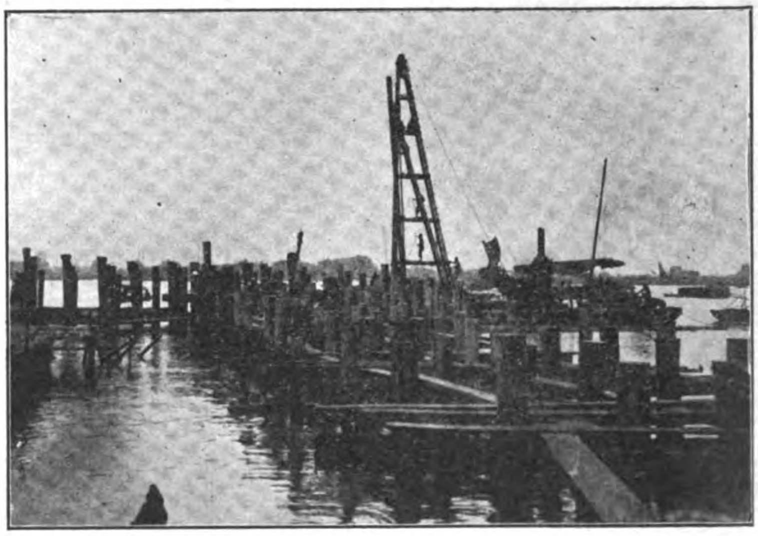


A 25-FT. FILL; SAINAM CUT, DEEPEST ON THE LINE, 70 FT. FROM SUMMIT, SHOWN IN THE DISTANCE



HAULING WASTE MATERIAL FROM SAINAM CUT TO MAKE HEAVY EMBANKMENT

END OF TRACK IN WONG TING SEE ROCK CUT



DRIVING PILES FOR WHARF AT WONG SHA TERMINAL

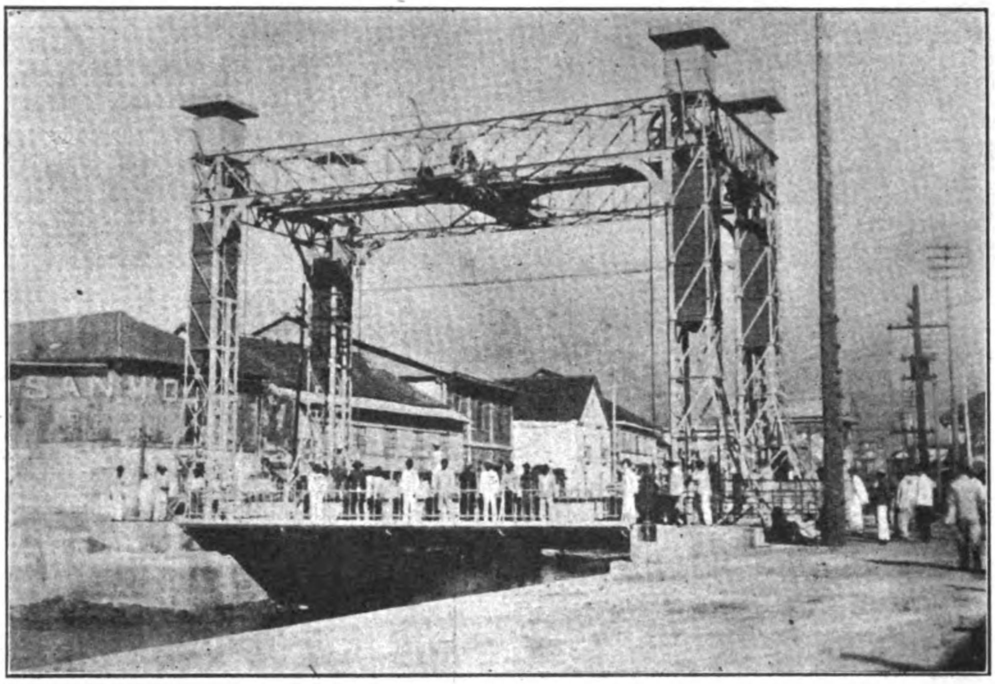
New Lift Bridge Which Spans the Binondo Canal, Manila

(Constructed for the City bv Messrs. Germann & Co., Ltd.)

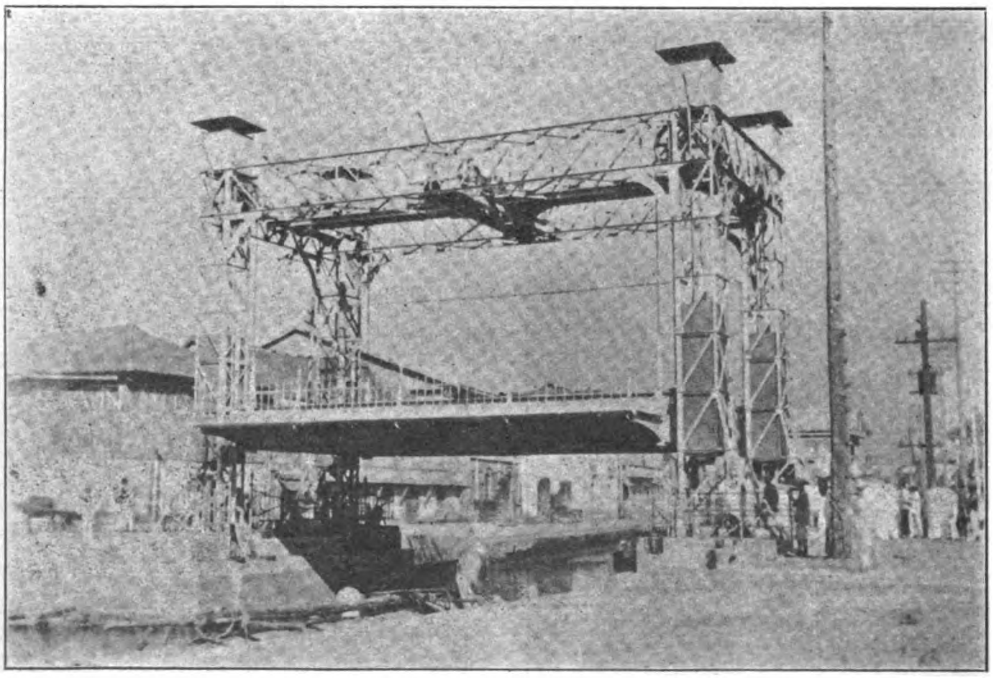
This bridge, which crosses Binondo Estero at the foot of Calle Soledad, Binondo, to Calle Prensa, San Nicolas, on the direct line of travel from the business district to the Custom House, is now completed. Its importance to the business interests is great, as a new avenue of traffic between the shopping centre and the waterfront will be afforded. The congestion at Blanco Bridge will immediately disappear and the haulage of heavy goods up the steep approaches of the latter will be reduced to a minimum. Since the completion of the tramway lines on Calle San Fernando, the traffic conditions have become very complicated and many accidents on Blanco Bridge have resulted therefrom. The new bridge will serve to direct a large part of the slow-moving traffic from Calle San Fernando and render unnecessary the heavy draying on Calle Rosario.

Work on the foundations commenced in July, but was carried on in a desultory manner until the middle of August. From that time on until the completion of the abutments in October, great energy was displayed in prosecuting the work. Much of the delay was due to the conditions which held at the site. The narrow waterway, the demands of the local traffic, and the presence of two very obstinate concrete walls directly in the line of the abutments added to the difficulties. It was decided to remove these old walls by blasting and to construct the foundations in caissons. It had been feared that the foundations afforded by the old walls would be insufficient to bear the superimposed loads, and not until a large part of the walls had been removed and a mass of well laid rip-rap was discovered was it decided to abandon the idea of complete removal of the old foundations. A row of closely driven retention piles of hardwood lumber was driven before and behind the bottom layer of the old foundations. Some difficulty was experienced in this driving, because of the old rip-rap and the occurrence of a number of retention piles about the old work.

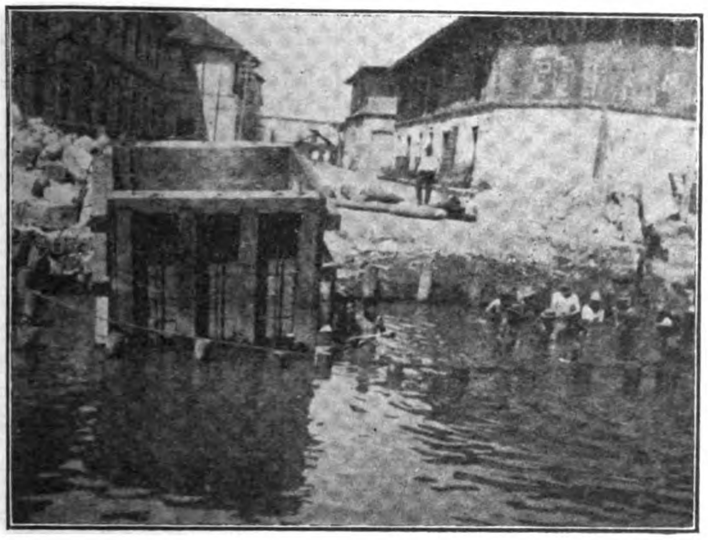
Four caissons were launched and set in place where the footings of the steel towers would bear. The bottoms of these caissons rested on the last course of masonry in the old foundations, which had been permitted to remain in place. To secure a better bond with the existing masonry, the timber grillage in the bottoms of these caissons was omitted and the caissons made water-tight by placing a row of sacks filled with concrete on the outside faces. The water in the caissons was removed with hand pumps and concrete rammed in place. The screen wall between the tower foundations were laid up in concrete on rip-rap, behind ordinary batter boards, as no great pressure could come upon them, and a costly method for a secondary

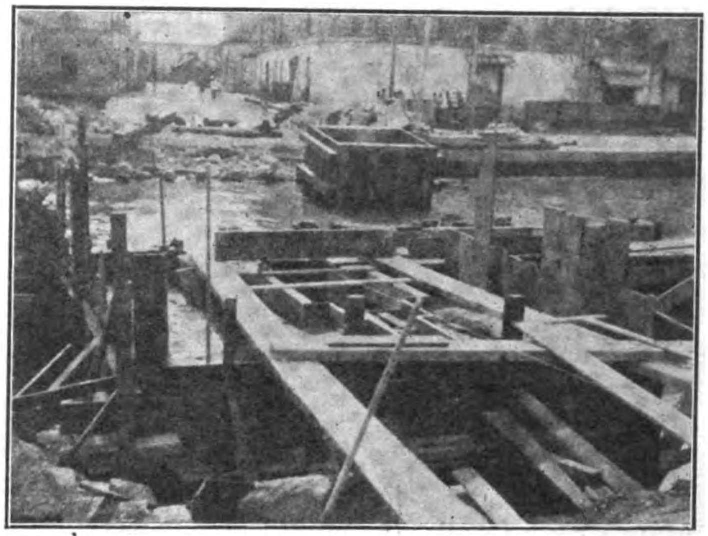


BINONDO LIFT BRIDGE ON THE DAY OF ITS INAUGURATION, DECEMBER 28TH, 1905.

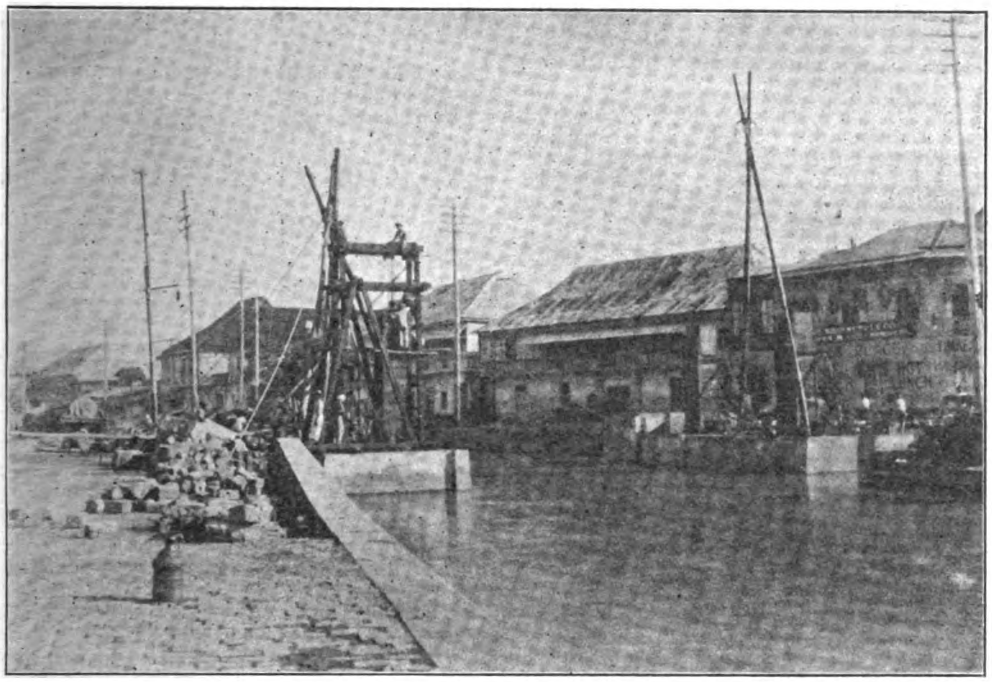


OPENING THE BRIDGE DURING THE INAUGURATION CEREMONIES.





TWO VIEWS SHOWING PROGRESS OF FOUNDATION CONSTRUCTION

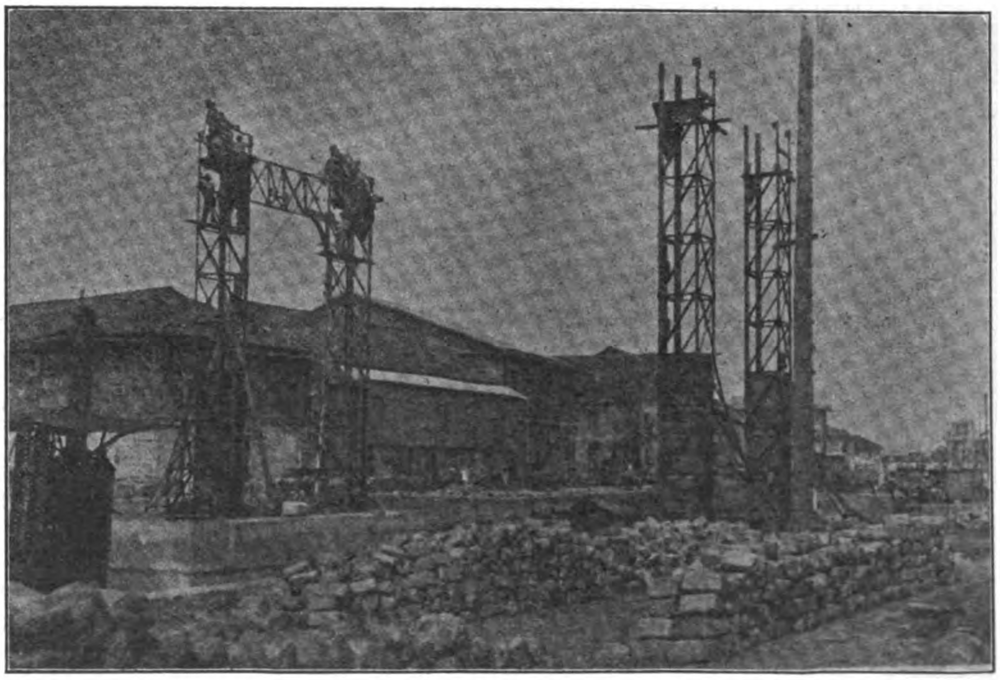


COMPLETED FOUNDATIONS; BEGINNING OF WORK ON THE MAIN STRUCTURE

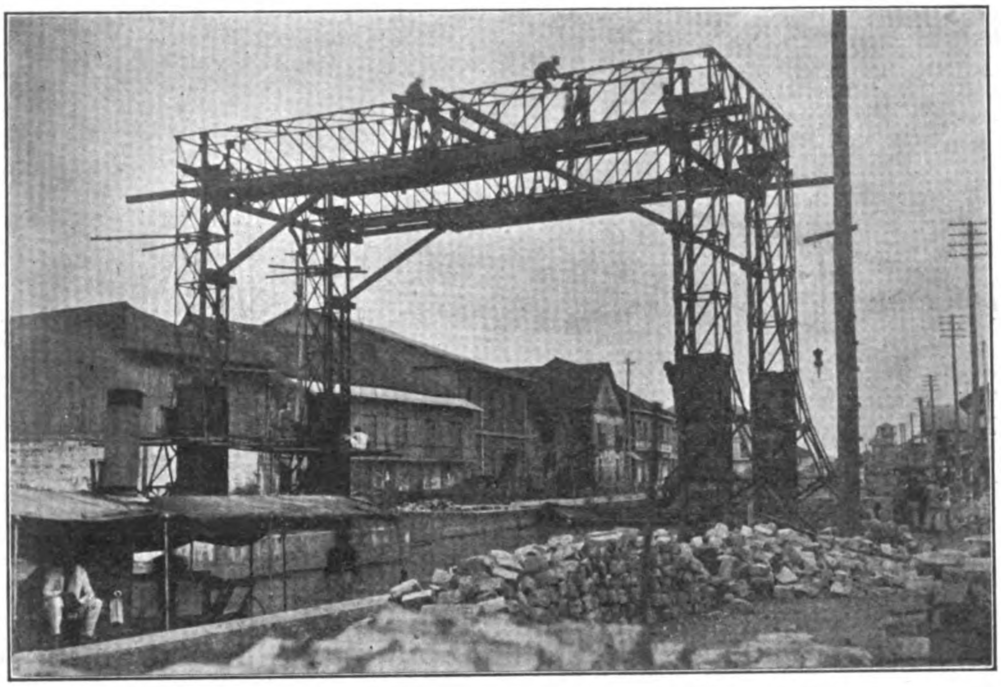
foundation was not warranted. The same method of procedure was used with the founda, tions for the machinery house. There, however- some soft material was encountered and a cluster of large Oregon fir piles was driven at the NW. corner.

The contractors for the steel work, the well-known Manila firm of Germann & Co., Ltd., commenced operations on October 1st, having been hastening the assembling of the steel work. On November 16th, the towers, floor system, cables, counterweights and sidewalk railings were in place, and progress had been made upon the buckle plate floor and the construction of the machinery house. A noticeable feature in the work has been the accurate fit of the several parts. Upon uniting the towers by the longitudinal and transverse girders, the rivets could be accurately inserted and little if any drilling was required throughout the structure. Considering that the towers and their connection girders were composed of a great number of small pieces, which arrived in Manila knocked down, and that the riveting was entirely entrusted to natives wholly unfamiliar with bridge work, the incident is rather remarkable and indicates the careful workmanship of the continental shops.

The new bridge is a very handsome structure. It is of the most modern type of lift bridge and is the first of that type ever built in these Islands. The bridge consists of one movable road bridge of 6.7 meters width with two sidewalks each of 2.31 meters width; and one solid construction of four towers each of 13.5 meters high, the top pieces of which are solidly joined together by steel frame girders. The whole moving machinery driven by an electro-motor of 30 h. p. for a current of 120 volts 2-phase 60 cycles on the center top of the upper girder construction works so that all shafts operate at the same time and equally. Opposite the motor a hand-operating device with brakerods in connection with the brake operated by an electro-magnet of 500 kilos-centimeters momentum, is provided of such a construction as to enable the operating of the bridge in case of accident to the machinery. For the purpose of a soft setting down of the bridge, or the counter-weights, there are four hydraulic buffers in the lower parts of the towers. They are supplied with the necessary water under pressure by a pipe connecting them with the tanks of about 1.5 cubicmeters capacity, placed on the top of each tower, the tanks being connected together by pipes and filled by an electric-driven rotary pump located in the machinery house. The automatic gates are attached to the towers and connected with the electrical apparatus in such a manner that opening the gates shall only be possible when the bridge is in its lowest position and in the same way the lifting of the bridge shall be impossible as long as the gates are open. Also automatical cut-offs of the electric current in both extreme positions of the bridge are provided.



FILIPINO SAILORS PUTTING TOGETHER UPPER WORKS OF THE SUPERSTRUCTURE, OCTOBER 22D



FILIPINO SAILORS MAKING THE OVERHEAD CONNECTIONS, OCTOBER 29TH

All this is done from one point—the operating house—which is built at the side of the bridge and which contains the very handome switch-board, the starting apparatus, the gates-moving apparatus with the automatical disengaging device in connection, the pump and the electric-motor for same.

The approaches to the bridge have been designated with a maximum gradient of 2.3 per cent and are easy to ascend. They are paved with Australian wood blocks immediately beyond the bridge proper and for a short distance beyond the lines of the sides of the abutments. Calle Prensa is also paved with blocks to Calle Barraca. The estero walls have been raised to grade with concrete and the granite coping stones carried to the intersections with the abutments. The surrounding properties have not been affected by the changes in grade and have in several cases been decidedly improved.

Messr. Germann & Co., Ltd., are well satisfied with the labor done exclusively by natives who once more have proved that, if the Filipinos are guided in the right way, capable and expeditious work can be obtained. As no men familiar with such work could be obtained for the erection of the high structure the contractors made for the first time a trial with natives who had been sailors before, and it was easy to observe that they erected the high structure with intelligent application. Altogether the construction of this bridge was most efficiently accomplished by Messrs. Germann & Co., Ltd., whose reputation for high-class engineering work has long been established.

TIENTSIN (N. CHINA) CITY IMPROVEMENTS

Municipal improvements are being carried to completion on a large scale at Tientsin, according to *The China Review*. Most of the work is confined to the Native City, but everywhere within boundaries the city is rapidly growing into a clean and orderly place. Says that paper:—This would almost have seemed an utter impossibility 6 or 7 yrs. ago. Everywhere one notices the hustling of busy workmen and the puffing of steam rollers "three at a time" it seems almost; in one vicinity so many do there appear. These heavy monsters of modern roadmaking go crawling slowly round, spluttering and crushin dogwn the prepared stones into a proper state of macadamization. But it would seem that in the city it is not considered necessary to import the usual outfit of the steam roller. The well-known board, bearing the familiar text "Beware of the steam roller!" is markedly absent. So much the better perhaps as the terrifying legend "Beware" seems so much worse than the actual steam roller, which seems a harmless enough reptile if kept at a respectful distance. Here, too, in the aristocratic vicinity of the viceroy's yamen, new houses and shops are being erected; all good brick buildings, and, now the paint is being added, very gay to behold. All the new roads are wide and as well kept as any in the foreign settlements and a great deal better than some of those. Water carts contentedly make their rounds, except on very rainy days, so that not much dust is to be found. One thing, however, the city yet lacks—that is good sanitation. Oh! one's poor nose, how it does ache from the necessary pinching, right down from that magnificent road of the Viceroy's to the poor old Taku-rd where one emerges for a "breather." It forcibly reminds one of the taking of medicine, very much pressed upon one, in early infancy. Even at this cold season the odors of decaying vegetables on the river banks wafted by the breezes are too much for the sensitive nasal organ of a foreigner. However, much has already been done, even on this score, all the old rubbish is rapidly disappearing, and it is too much to expect an achievement like Rome in less than a decade.

PHILIPPINE ISLANDS (1905-6) BUDGET ·

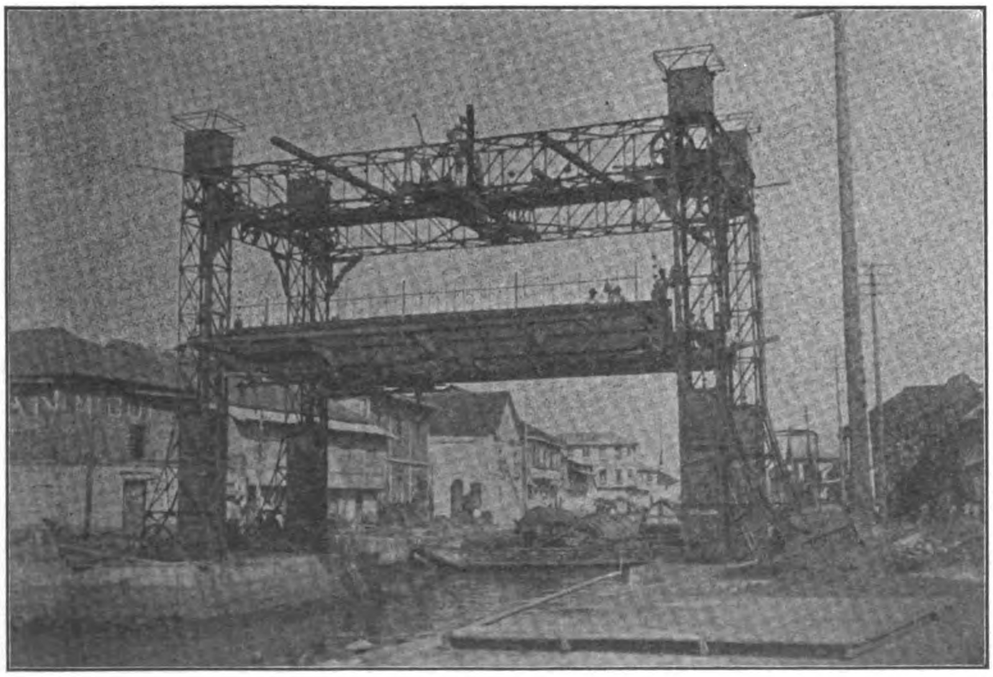
The following sums have been appropriated out of the Insular Treasury of the Philippine Government by the civil commission for the service of the government for the fiscal year ending June 30th, 1906:—

Philippine Commission, ₱80,000; executive, ₱114,000.
Executive Bureau, ₱475,000.
Bureau of Civil Service, ₱80,000.
Bureau of Health, ₱902,500.
Bureau of Lands, ₱265,000.
Bureau of Science, ₱315,000.
Bureau of Agriculture, ₱322,800.
Bureau of Forestry, ₱153,000.
Bureau of Quarantine Service, ₱125,000.
Weather Bureau, ₱9,000.
Mining Bureau, ₱9,915.10.
Ethnological Survey, ₱4,951.57.
Philippine Civil Hospital, ₱66,000.
Civil Sanitarium, Benguet, ₱23,250.
Bureau of Constabulary, ₱3,292,000.
Bureau of Public Works, ₱548,003.70.
Bureau of Navigation, ₱1,433,000.
Bureau of Posts, ₱842,000.
Bureau of Port Works, ₱10 *per diem* to United States Army officer detailed in charge of this bureau in lieu of army allowances which said officer may lose by reason of such civil detail, *per diem* effective as of date August 16th, 1905.
Bureau of Coast and Geodetic Survey, ₱175,000.
Signal Service, ₱130,000.
Consulting Architect to the Philippine Commission, salary ₱12,000 *per annum* from September 20th, 1905. and for transportation and incidental expenses, ₱10,000.
Bureau of Justice, ₱839,400.
Bureau of Audits, ₱295,000.
Bureau of Customs, ₱971,500.
Bureau of Internal Revenue, ₱442,000.
Bureau of the Treasury, ₱160,582.
Bureau of Education, ₱2,900,000.
Bureau of Supply, ₱388,000.
Bureau of Prisons, ₱862,500.
Bureau of Printing, ₱416,700.
Bureau of Cold Storage, ₱305,000.
Bureau of Archives, ₱7,268.43.
Bureau of Architecture and Construction of Public Buildings, ₱58,100.
The *Official Gazette*, ₱3,050.
American Circulating Library, ₱1,610.84.
Custodian of the Fortin Building, ₱1,850.
Superintendent of the Intendencia Building, ₱3,748.43
Superintendent of the Oriente Building, ₱3,960.
Custodian of the Santa Potenciana Building, ₱2,460.00
Provisional Government of Benguet, ₱20,000
Provisional Government of Lepanto-Bontoc, ₱29,250.
Provisional Government of Mindoro, ₱44,700.
Provisional Government of Nueva Vizcaya, ₱17,50.0
Provisional Government of Palawan, ₱12,500.
Provisional Government of Zambales, ₱5,000.

The total appropriations for all purposes, including several miscellaneous items which are not enumerated in the foregoing, amount to ₱17,342,061.01.

TAFT HAS VALUABLE SUPPORT

The Merchant Marine Commission of the United States is supporting Secretary of War Taft in urging that the extension of the coastwise shipping laws of the homeland to the Philippine Islands be indefinitely postponed, that congress grant the Philippines a reduction on sugar and tobacco entering the United States to 25 per cent of the Dingley tariff, and that free trade should be established between the United States and the Philippines after 1909, when the commercial agreement under the Treaty of Paris will have expired with Spain. The Merchant Marine Commission presented its recommendations to congress last month.



CONSTRUCTION OF THE ELEVATOR, NOVEMBER 16TH

STRONG PLEA FOR THE MODIFICATION OF PHILIPPINE MINING LAWS

In his forthcoming sixth annual report to Commissioner Dean C. Worcester, Secretary of the Interior, Government of the Philippine Islands, Mr. H. D. McCaskey, Chief of the Mining Bureau, will make a strong appeal to the congress at Washington for a modification of the mining laws of the Philippines, showing the urgent necessity of relief to insure the development of the mining industry in the archipelago, which, under more liberal legislation, is destined to prove an important factor in the promotion of prosperity and progress of these possessions under American rule. Mr. McCaskey's report is now in the hands of the public printer, and will cover the operations of his bureau during 1905, before it became a division of the Bureau of Science. By his courtesy THE FAR EASTERN REVIEW has come into possession of advance pages of the report which deal with this important subject, under the caption, *Mining Laws: Urgent Need for Their Modification.* Mr. McCaskey says:

I have the honor to invite your attention to certain sections and provisions of the Act of Congress approved July 1st, 1902, entitled "An act temporarily to provide for the administration of the affairs of civil government in the Philippine Islands, and for other purposes." These sections and provisions constitute portions of the mining legislation at present in force in these Islands, and, by reason of their restrictions, have been subjected to constant complaint and frequent request for their repeal or modification, by interests proposing and attempting the difficult work of development of the mineral resources of the Philippines.

The sections and provisions of the above mentioned act that have been most severely and frequently criticized are as follows:

Section 33 (entire). This reads as follows: "That no holder shall be entitled to hold in his, its, or their own name, or in the name of any other person, corporation or association more than one mineral claim on the same vein or lode."

Section 56 (pertaining to coal lands) the last two provisions: "* * * *; and all persons claiming under section fifty-eight shall be required to prove their respective rights and pay for the lands filed within 1 yr. from the time prescribed for filing their respective claims; and upon failure to file the proper notice or to pay for the land within the required period, the same shall be subject to entry by any other qualified applicant."

Section 75 (pertaining to corporation) the following provisions: "* * *; and it shall be unlawful for any member of a corporation engaged in agriculture or mining and for any corporation organized for any purpose except irrigation to be in any wise interested in any other corporation engaged in agriculture or in mining."

The discussion of these sections and provisions will now be undertaken from the standpoints of my connection of over 5 yrs. with the Mining Bureau and the development of the mineral resources of these Islands, of my observations for nearly 3 yrs. upon the working of these provisions and particularly of *Section 33*, of the complaints and appeals constantly made by prospectors, miners, and others interested in our mineral resources, concerning the application of these severe restrictions under present and local conditions, and finally of some serious study upon my part during these periods concerning these conditions to be dealt with, and the advisability of more liberal legislation at the present time.

Section 33.—It has been understood that the Congress of the United States, in its wisdom, provided this section for protection of the natives of these Islands as against exploitation on the part of Americans, or others, "at the expense of the Filipinos" and that for this purpose alone this restrictive measure was deemed necessary at the time, that is, in July, 1902.

It has been a matter of common observation, I believe I may safely state, in these Islands during the past 3 yrs. that no undue or improper efforts have been made, that might have been prevented by *Section 33*, by Americans or others, to exploit mineral lands *at the expense of the Filipinos*. In other words, it has never clearly appeared that natives of these Islands would have suffered injury or loss through the operation of the present mining laws, with *Section 33* omitted entire.

On the other hand the great difficulties of geological exploration and field prospecting, due to the excessive obstacles imposed by the luxuriant forest and jungle growth of the tropics, and by the excessive thickness of soil overlying rock formations; of the present limitations in number of intelligent prospectors and miners; of the great distance from the United States wherein would naturally lie the greater portion of the previous associations and support of this prospecting class; of the consequent difficulty of securing capital; and of the somewhat uncertain political future of these Islands; these difficulties and others have combined to check mineral exploration and development, and the result is that large portions of the Islands have not been covered by prospectors even to the present day. It will therefore be seen that there has been no tendency shown as yet to overdo prospecting in the Philippines nor has capital in any important amount interested itself in this necessary preliminary work. The Filipinos as a race have not been made to suffer during the prospecting and locating already done, and the few cases of claim jumping, common to every mining camp, have been irrespective of race. Finally, whatever contests concerning mining lands have been argued in the courts have been impartially and judicially acted upon.

The purpose and intent of the Congress of the United States, as exhibited throughout the act of July 1st, above quoted, were plainly to protect the people of these Islands against monopolies, corporation rule, and unfair and dishonest acquisition of the public lands, mineral and otherwise. This expression of fair dealing to a people, conquered or acquired, has been followed by the Philippine Commission as well as by the administrations and the Congress of the United States, in spirit and in letter throughout all the formative and constructional work performed in connection with the American occupation of these Islands during the past 5 yrs. This principle of protection of the rights of the Philippines meets with the hearty approval, and wins the active support, it is believed, of all right thinking Americans; and it is not believed that there is any tendency either in the Philippines or elsewhere, to exploit these Islands *at the expense of the Filipinos*, which cannot be met and as completely checked as is possible by legislation, by the Philippine Commission, or by the Philippine Assembly to be elected within a few years. It is believed that it can be shown, furthermore, that with the delegation of the interests of the natives of these Islands to the legislative powers at present representing the United States in the Philippines, there is no present necessity for the continuance of the restrictions of *Section 33*, and that rather, there is grave danger during such continuance, that the mineral resources of these Islands will not be exploited at all, this at the real expense of the Filipinos to whom the greatest ultimate advantages must come by the development of what latent mineral wealth may here be found.

In July of 1902 there was understood to be no court of record competent to pass upon and settle disputes arising over titles to lands, mineral and otherwise, and, at this time following upon the years of Spanish rule, there were found large and valuable portions of public lands claimed under various laws, provisions, and customs, by Spaniards, natives, and others, with titles more or less imperfect, inchoate, or completely void. At this time, and without legislative and judicial protection, particularly for mining claims, such as was urged by my predecessor, the present Hon. Charles H. Burritt, judge of the Court of First Instance, the rights of natives and others to land occupied in good faith by them were in many cases believed to be without legal support. Since the passage of the act of Congress, above frequently referred to, however, and on November 6th, 1902, the Philippine Commission created a Court of Land Registration with complete power to pass upon land claims and to grant to natives and others, under the admirable Torrens System, the most complete protection for their rights. Since that time also, capital from the United States and elsewhere has been freely invited to develop the system of rapid transportation now successfully completed in Manila, a complete and modern telephone system for Manila and elsewhere, and a thoroughly modern and effective railway system for the entire archipelago. Not only has the commission been empowered to invite bids for development of the City of Manila and of the Islands along these lines but they have also been authorized to encourage single bids, or operations of single corporations constituting, practically, monopolies, for the purposes above set forth. It is pretty generally agreed that it is the part of wisdom thus for them to act. In view of the above statement it is difficult to understand that a corporation or other consolidation of interests, or several of them, in a given mineral district might not safely be encouraged under such regulations and restrictions as the Philippine Commission may in its wisdom deem just. It is not therefore believed that the operation of *Section 33* is at present required upon the ground that it is necessary for protection of the best interests of the natives of the Philippines. Upon the other hand it is the opinion, I think I am justified in saying, of the mining community, and the government alike, that the further operation of this section will be at a loss not only to the American citizens, who have been the potent factors in development in the Philippines, but also to the natives, who suffer precisely the same disadvantages as the Americans from the provisions of *Section 33*, and who can profit no more therefrom.

As the necessity for protection of native rights provided for in *Section 33* does not now arise and as the Philippine Commission have been charged, and have for 5 yrs. exercised their most deliberate thought and greatest wisdom in their legislation, with the protection of native rights, as the natives have now the desired means for securing full and final recognition of land claims of whatever class through the Court of Land Registration, and as there has never been, apparently, but the one motive above assumed for the enactment of *Section 33*, it is respectfully submitted that this section may safely be repealed, thereby delegating to the Philippine Commission which is in thorough touch with local conditions and demands, under *Sections 36, 49*, and *52* of the act above quoted, the increased power following such repeal, to restrict undue appropriation of public lands.

Following an affirmative reply to the question "May *Section 33* safely be repealed?" there arises the further question "*Should* this section be repealed?" It has been the unanimous opinion of natives, foreigners, and Americans, official and otherwise, so far as I have heard opinion expressed upon this subject since the present mining legislation has been in force, that *Section 33 should* be repealed. The reasons for this are not far to seek.

In *Section 21* of the act of July 1st, 1902, the right to explore, occupy, and purchase mineral public lands, is restricted to "citizens of the United States or of said Islands." The most secure and profitable investment of capital in mineral deposits not patented in the Philippines would be that apparently coincident with rights to explore, occupy, and purchase. Up to the present time, during American occupation foreign capital has shown almost no disposition to enter upon development of mineral claims nor has such capital been encouraged so to enter, by legislation or otherwise; up to the present time also, native capital has proved insufficient for the development of even a reasonable proportion of the agricultural resources, except in a most primitive way. It is therefore plainly evident that the capital absolutely essential to the development of the mineral resources of these Islands in a thorough and profitable manner must, under American sovereignty, be expected to come from citizens of the United States. The distance to, and from, the United States is so great that close contact or communication, on the part of capital there, with possible

fields of investment here, is only possible by representation through agencies in the Philippines, and in the case of mineral resources, these agents would naturally be consulting mining engineers, metallurgists, or geologists, as the case may be. The expense of retaining professional men of this class even to report upon mineral fields, is so great that it can only be considered under most favorable conditions; yet capital at the present time is dependent upon its consulting engineers as it is upon its attorneys, and properly so. It is reasonable to assume that no minor representative of capital, still less a consulting engineer, would visit the Philippines for the purpose of investigating and reporting upon the value of any *one* unpatented claim, 1,000 ft. sq., upon any one lode, or several such claims upon as many lodes; and yet no one person, corporation, or association could offer more that is unpatented under the law. It is obviously objectionable for capital to deal, or attempt to deal, with as many persons, corporations, or associations, as it may desire claims; only under exceptional geological conditions could systematic mining methods be followed under such prohibitive conditions as these. It is difficult at present, therefore, to induce capital in the United States even to consider mining in the Philippines. But it requires capital to develop and patent claims; and it is with the unpatented that we are chiefly concerned. It would seem apparent from the above line of thought that capital from the United States will not become interested in unpatented claims under *Section 33*, and that unpatented claims cannot therefore be developed into mines. Exception to this might possibly lie in the case of *bonanza* or exceedingly rich claims; but it is probably unnecessary to add that *bonanzas* are relatively few—certainly they have not yet been discovered in the Philippines, where the richest gold ore have averaged in value from $2 to $50 to the ton. The great majority of the mines of the world are concerned with middle and low grade ores, and Philippine conditions are alike to those of other mining regions in this respect. The greatest skill and professional ability of the modern mining engineer and metallurgist are dedicated today to technical improvements, by which costs may be reduced, and deposits of lower grade may therefore be made profitable to work. An essential to reduction of cost is the opportunity to consolidate claims and work upon a large scale. This is vital with low grade ores. The problem is largely therefore one of *cost*, an economic feature even more severe in mining and in metallurgy than in ordinary business or governmental administration for the reason that in reduction of cost the most expensive professional advice is required, and the natural obstacles are complex and difficult to the highest degree.

In the Philippines the ores are of middle and low-grade and economic problems enter from the first. In addition to this, problems of difficult tropic conditions, labor, transportation, and supplies, must be met, once capital is secured. The topographic, climatic, and geologic feature of the Philippines render prospecting exceptionally difficult, and to these and to other unfavorable conditions may be ascribed the lamentable fact that notwithstanding an occupancy of several hundred years our Spanish and native predecessors succeeded in developing no mines worthy of the name. Resulting from this, the natives of these Islands are neither intelligent prospectors nor miners in the modern sense, and with the exception of a limited number of Igorotes, Bicols, and others, not even primitive mining is done. There is therefore no important mining community among the Filipinos and the interests of mining development are at present largely in the hands of a small number of American miners and prospectors. Were these men to leave the Islands, as many of them have done, the mineral resources would undoubtedly lie undeveloped for an indefinite number of years as there is no mining class among the natives yet bred to take up their work. The future of the mineral industry is believed, therefore, for the present to be dependent upon these hardy, intelligent and invincible American pioneers, who have laboriously blazed the trail, as they and their forbears developed our West. They have penetrated the wilderness and have in five years developed and opened up several promising mining districts that were little known and less developed during all the centuries before they came. They have overcome, and it is believed can overcome, every important obstacle save a lack of sufficient capital to proceed with their work. For several years they have drawn upon their own limited resources and those of their friends in the Philippines; they have now reached that point when capital upon a larger scale is practically an essential to success. They have developed mineral districts, but their finds have largely been in middle grade and low grade ores. The problem of cost of mining and cost of production is a vital factor in their relations with capital, and it is therefore necessary that they be able to offer more, to guarantee the further development required to justify erection of works, than *Section 33* will allow. Extensive deposits of the above class of ores are believed to exist in the Philippines and after 5 yrs. of work in these Islands I am prepared to express my belief that an important and profitable mining industry *can* be built up here with proper encouragement, and this with no menace whatever to the rights of the natives, but rather to their material advantage in all that development and industrial progress must necessarily mean to them.

In their annual reports for 1903 and 1904, the Chief of the Mining Bureau, the Secretary of the Interior, and the Philippine Commission have recommended the repeal of *Section 33*. It is respectfully submitted that this action is now of vital importance to the mining interests of these Islands, that it can be safely taken, and that it should be taken at the earliest practicable time.

Section 56.—The provision within this section deemed hostile to early development of coal lands is as given above.

It should be stated here that *literally construed* this provision offers no objection whatever for the reason that *Section* 58 quoted in this provision refers to saline lands alone; and in *Lindley on Mines*, page 1683, this construction is evidently made, as the subject brief of this clause reads: "Saline Claimants, when must pay." As *Sections 53, 54, 55, 56* and *57*, constituting the legislation embraced within the act of July 1st, 1902, for coal lands, are almost literally the *U. S. Revised Statutes 2347, 2348, 2349, 2350*, and *2351*, constituting the present legislation for coal lands in the United States, and as the corresponding restricting clause in *U. S. Rev. Stats. 2350* refers to coal lands mentioned in *U. S. Rev. Stats. 2348*, it is assumed that by taking advantage of an apparent typographical error alone in *Section 56*, can the construction be that the lands referred to are the saline lands of *Section 58*, and not the coal lands of *Section 53*, which section corresponds to *U. S. Rev. Stats. 2348*. The interpretation upon which the following is based is that accepted as the undoubted intent, though not literally expressed or legally binding perhaps, of the law as framed.

Although this provision is in terms the direct adaptation to the Philippines of a federal provision now in force concerning coal lands in the United States (*Rev. Stats. 2350*) it is believed that under Philippine conditions a prescribed period of 1 yr. and 60 ds. is too limited a time within which coal claims must be entered upon, recorded, sufficiently developed to demonstrate their value, and *paid for in full*. Geologic problems upon which values of coal land depend have not yet been satisfactorily solved, and all difficulties relating to capital, as discussed under *Section 33*, apply in this case. Furthermore, the payment for lode claims is extended over a period of 5 yrs., or until such time as accrued assessment work to the value of $500 may have been done upon each lode claim, or until the locator thereof desires to obtain a patent therefor by purchase at a fixed rate of $5 per acre. A locator of a lode is thus given sufficient time within which to prove the value of his claim; whereas the locator of a coal land claim must be satisfied within 1 yr. and 60 ds. after occupation of his claim that he is prepared to pay the prescribed price in full. This involves the expenditure of large amounts of capital for development, surveys, and title within so short a period that under present conditions it is practically prohibitive.

It is respectfully submitted that the coal land laws be revised to the extent that the period for development and payment be extended to at least 3 yrs., or until such time as the public lands involved may have been surveyed and mapped under a system of public land surveys, in harmony with *U. S. Rev. Stats. 2349*, and the practice in the United States, (*Lindley on Mines*, Vol I, §505), said revision delegating to the Philippine Commission such powers as may be required to encourage *bona fide* coal mining and to prohibit mere speculation in land, or monopolistic control.

The coal resources of the Philippines are believed to be extensive and to promise an important supply of steaming coal. The economic features and importance of a home supply are so obvious that they will not be enlarged upon here. The local conditions above referred to are such however that it is believed a coal mining industry must be encouraged by more liberal legislation than at present obtains.

Section 75.—The provisions of this section, quoted before, considered inimical to mining development, will in effect so circumscribe corporations as largely to discourage their interest in mining in any form. Furthermore, interests connected with corporation capital "organized for any purpose except irrigation" are prohibited from investing in either agricultural or mining projects which corporations may control.

These prohibitions are particularly severe in view of the fact that a large number of the best and most substantial capitalists are largely involved in corporate interests and that with these profitable and promising mining companies are closely allied as well. Were the interests of the natives or the general public menaced by corporation control or fraud Philippine Commission, it is believed, or the Philippine Assembly, would, by such legislative restriction as may be required, extend to them all protection demanded under such conditions as may arise. This has even now been accomplished in the form of corporation capital invested in rapid transportation within the City of Manila, and of proposed corporation investment in modern telephone and railway development here.

It is respectfully submitted that the corporate interests, being largely the capital interests, should be encouraged under such protective legislation as the Philippine Commission may provide, to assist in the development both of agricultural and of mineral lands. It is believed that this may safely be done without such prohibitive enactment as that above quoted in *Section 75;* and considerations presented under the discussion of *Section 33* are submitted as bearing upon the operation of the restrictive clause of *Section 75* as well.

ADDITIONAL LEGISLATIVE DEFECTS.—In addition to the considerations above, and in connection with the proposed draft of an act amending the act of July 1st, 1902, I desire to call your attention to additional important considerations as follows:—*Assessment Work*—(a) Should the time within which coal lands must be paid for be extended to 3 yrs., as urged above, it would seem advisable to require some assessment work corresponding to that upon lode claims and for the same reasons, *i. e.*, to prevent the holding of tracts of land for speculative purposes alone. I would suggest therefore that a total of not more than $200 worth of assessment work for each coal claim held for 3 yrs. be required before a patent be issued therefor. (b) As the Philippine miners have frequently requested specific authority, such as is granted in the federal law of the United States (see *Lindley on Mines*, p. 1167) to group assessment work for several claims in order that annual labor may be performed upon one of a group for the development of the whole, I would urge that a proviso be inserted in the proposed amended act to the effect "that where a group of two or more contiguous lode, coal, or placer mining claims are held in common the annual labor required by law for all in the group may be performed upon any one of them for the development of the group." This, in my opinion, is a most important and valuable addition to the law. *Dredging Claims in Navigable and Tidal Waters*.—In a recent letter to you upon this subject I invited attention to the important fact that after careful study I find there is at present no legislation, apparently, permitting

the mining or dredging for gold or other metals in navigable and tidal waters of these Islands. As many navigable and tidal streams and bays of the Philippines are believed to contain deposits of these metals that may be profitably worked, and as two modern dredging plants are now in Philippine waters for this purpose, I strongly urge the enactment of legislation, based possibly upon the Alaska Code of 1900, whereby these waters may be declared subject to exploration and mining by virtue of licenses to be granted by the Governor General and under such regulations as the Philippine Commission or their successors may provide.

VIEWS OF PHILIPPINE MINING MEN.—In this connection I would state that not only in personal conversation with mining men in the Philippines and in the United States, over a period of 3 yrs., have I been impressed with the unanimous conviction that present restrictions in Philippine mining legislation should be materially modified, if not absolutely repealed, but that upon the occasion of the recent visit to these Islands of the distinguished congressional party accompanying the Secretary of War, this office has received a large number of letters, in response to a circular from this bureau requesting an expression of views upon this subject, strongly advocating prompt repeal of the restrictions mentioned above. These letters are from representative miners, prospectors, business, and professional men, and are unanimous in their appeal for better mining laws; and with their writers I heartily sympathize and agree.

CONCLUSION.—In conclusion attention is respectfully called to the fact that as far back as 1849 President Fillmore, in his first message to congress, recommended that the public mineral lands "* * * be divided into small parcels and sold, under such restriction as to quantity and time as will insure the best price and guard most effectively against combinations of capitalists to obtain monopolies." (*Lindley on Mines*, Vol. I, §48), and that this was followed by the acts of July 26th, 1866, and of July 9th, 1870, which were in turn superseded by the act of May 10th, 1872, now incorporated within the *Revised Statutes* and forming the present federal mining legislation of the United States. In the act of 1866, only, may be found any provision limiting the number of claims that any one person, corporation, or association may hold upon any given vein or lode, and at this time, only, within federal legislation for the United States, was it deemed essential, apparently, to the best interests of the public that such restriction be required. This act was repealed in less than 6 yrs. by the law of May 10th, 1872, now forming the federal mining code. Not until the act of July 1st, 1902, herein frequently referred to, was such restriction again placed within federal legislation, and in this instance for the safe-guarding of the rights of the Filipinos rather than of those of the public at large. No such restriction is known to me in any mining legislation elsewhere and its working may therefore be said to have been observed in the Philippines alone. That this, and other restrictions above noted, should be wholly removed, or materially modified, in the best interests of the development of the resources, and through them of the people of these Islands, I respectfully submit.

WEI-HAI-WEI GOLD MINING COMPANY, LTD.

At an informal meeting of the shareholders of this company in Shanghai recently, the final report of Mr. W. Denham Verschoyle, who has retired from the management of the mines, was received. The report was as follows:—

While I regret that development is not sufficiently far advanced to enable me to give exact figures about the quantity of ore standing over the 200 ft. level, the reasons for my inability to do so may justly be considered anything but unsatisfactory.

I had hoped by sinking winges from the 100 ft. and drifting on the 200 ft. to open out certain blocks of ore. After the work was well advanced it was found that the sinking was going on the one vein and the drifting on another, the presence of which had not been suspected and which was not sufficiently far away from the other to make the error obvious at first. The net result is therefore that in place of having 3 or 4 blocks cut out and sampled on four sides we have twice the number of blocks cut out on only 2 or 3 sides and therefore insufficiently developed for exact estimation. I shall therefore have to make this report chronicle observed facts, geological and others, and leave it to my successor to give you figures later.

GEOLOGICAL.—Diagram I shows my conception of the system of veins as they appear to be at the 200 ft. level. The country rock was originally granite but has a gneissic structure owing probably more to mechanical causes than flowage The system of veins are of pneumatolytic origin and therefore unlikely to carry gold and silver in payable quantities. They are very numerous and dip to the E., and are older than any of the others shown. The main dyke dips to the W. and therefore cuts across the series. While cooling, this dyke contracted and various fissures were formed along its walls and across it at various angles and these fissures subsequently formed channels along which ore-bearing liquids could travel and were filled up with quartz and other minerals. There are very distinct evidences that a subsequent twisting movement fractured these smaller veins and opened out large cavities more particularly in the neighborhood of No. 3 shaft, a secondary silicification taking place of apparently very much more importance than the primary from a commercial point of view, in that it has been the cause of the formation of the large ore body here met with. That there was a secondary action is proved by the fact that blocks of the original quartz are often met with, its bluish color and banding being very noticeable among the white massive secondary quartz. That there were large cavities formed by some agency is proved by the beautiful crystallization of the quartz and the large existing cavities met with. That the whole action has been very intense and therefore probably deep-seated is shown by the evidences of metasomatic replacement and the alteration of the country rock about No. 3 shaft, which indeed was my main reason for pushing development in this part of the mine. The principal deductions to be drawn from the facts observed are, that since the fissuring and the filling have been conducted on such a large scale, it is entirely improbable that they are of purely local origin. I think it is quite reasonable to expect that at and below the 300-ft. level you will still have a large body of quartz. There are evidences that this secondary silicification will extend further to the N. as the workings go down and this is likely to have a most important bearing on the values, which appear to be more regular where this action has taken place.

ORE TONNAGE AND VALUES.—For the reasons given above it is impossible to go into this question with the proper degree of exactitude. The following figures, I think, will prove to be a very conservative estimate:

Above 200 ft. level.

Dumps	3,000	*Tons.*
Broken in Stopes	700	"
No. 1 Vein	2,000	"
" 2 "	4,000	"
" 3 "	2,700	"
" 3 Shaft	7,300	"
Total	19,700	

Every foot we go S. from No. 3 shaft adds very largely to this reserve and at present we have absolutely no data as to the limits in that direction.

It is a very noticeable feature of our year's development that while we had only about 100 ft. of ore on the 100-ft. level, we have already passed through 270 ft. of ore on the 200-ft., and I can at present see no reason why a further improvement may not be expected on the 300-ft. The above reserve gives us ore for 9 mos.' milling and as within 2 mos. we should be breaking ore on the 300-ft. and within 8 mos. on the 400-ft., it looks like we should be able to keep the mill busy for some time to come.

THE CHAIRMAN —So that the quantities of ore give us every hope for the future and in my interview with Mr. Cole, our new manager, he entirely confirms all Mr. Verschoyle has written and says he himself is satisfied that we have a large quantity of ore that we shall be able to put through our mill. That is the subject of the quantities of our ore; we shall come to their values next.

VALUE.—The report proceeds:—Since we have a considerable tonnage of both very low grade and high grade ore it is obvious that we can mix them to produce almost any grade required. As our reserve are not large every endeavor possible should be made to work as low a grade ore as possible, at least for the 1st yr. The cost of mining and treating a ton of ore, if arrived at carefully, will give a basis for calculation. In my May report I gave the following figures and I can see no reason for altering them at present.

Mining (inc. development)	$1.00	(*gold*)
Sorting	05	"
Milling	98	"
Cyaniding (see below)	20	"
General	50	"
	$2.73	(*gold*)

I admit that it will require close management to reach this figure, but at the same time I am confident that a lower figure can be reached and therefore I think $2.73 can be taken as a basis for figuring.

Any ore worth over $2.73 will pay to put through. In 3 mos. from now it will be easier to judge what can be done. The dump has been roughly sorted and careful sampling gives $5 assay value. If there are values going out on the waste dump this is too closely sorted and on the other hand if ore is coming in well on the 300 and 400 it might be politic to sort still closer, and send in $6 or $7 ore to the mill and thus work out our at present available reserves in 6 mos. There is however absolutely no doubt in my mind as to what is our present policy. It is—to cut down every cent of unnecessary expense and work the lowest grade ore that will yield a profit.

TREATMENT.—I think it is unnecessary to place on record the details of my experiments for the last few months. The main final conclusion I have arrived at is that the ore is amenable to cyanide treatment and that the best results are obtained by fine grinding and agitation. It would however be most unwise to think of erecting any plant without further experiment and this can best be carried out whilst the mill is in operation and there are plenty of concentrates to work on. It will not be a question of treating the whole pulp as it comes from the mill. Most of the values are contained in the concentrates about 5 to 10 per cent of the whole. It will therefore be a question of regrinding 10 tons in every 100 put through the mill from 30 or 25 mesh down to 300-150 and treating the resultant fines by agitation and filter pressing. Unless certain minerals appear in the ore, this can be done for about $2 per ton of concentrates under the most favourable circumstances. However we can hardly expect so high a percentage of concentrates and the cost of treatment will probably run higher so that for present purposes we may take 20 per ton of ore milled as the cyaniding cost. Until final determination can be arrived at on this point there is no question that the wisest course will be to ship the concentrates to a smelter. This will give returns from the concentrates in from 6 to 8 w. after starting the mill without any heavy outlay for new plant. My experiments show that we may expect to save 20 per cent of the values on the plates at the mill. A $2.85 freight rate from the mill to the steamer has been arranged. We have quotations for freights to America at $8 and smelting charges at $10. Treating 100 tons of $5 (gold) ore having 7 per cent of concentrates and allowing $1 tailings will thus work out somewhere as follows:

100 tons @ $5 (gold)=$1000 *Mex.*
less $1 tailings=$900 "

COSTS.

Mining, milling, etc. 100 tons	=$506 (*Mex.*)
Bags, bagging, drying 7 tons conc	= 47
Land freights 7 tons conc	= 19.95
Ocean freights 7 tons conc	= 56
Smelter charges and deductions conc	= 106
Insurance, sampling, general, conc	= 20
	$754.95

RETURNS.

20 per cent of total value, saved on plates	$200
Saved by smelter	700
	$900.00
Less charges	754.95
Profit on 100 tons	$145.05

It must be remembered that these figures are only approximations, as excepting land freights no contracts have been entered into. Also no account is taken of copper as it is questionable whether there will be more than the smelter minimum allowance.

It will be noted that the total cost under this system is $7.54 (Mex.) per ton of ore delivered to mill. Allowing $5.06 (Mex.) for all charges except treatment of concentrates, and allowing even as high as $1 per ton of ore mined for cyaniding, we would still make a further $1.48 per ton profit, by installing this process. It is obvious therefore that exhaustive tests should be entered upon at once and a suitable plant erected as soon as definite results have been obtained. The experiments already made show that the ore can be treated, but this is only the first step and the easiest. The elaboration of the working process will take time and much careful thought.

MANAGEMENT.—This is a question that requires as much consideration as any other in the operation of a mine. It is imperative that we should work the very lowest grade ore upon which a profit can be made, since our reserves are low. This means that costs must be cut wherever possible. Take the case of dynamite. This costs us now 80 cts. per lb. and we use say 1,250 lbs. per mo. that is $1,000 per mo. Other mines are using the same dynamite, purchased under contract, at 40 cts. per lb. If we mill 2,000 tons per mo. dynamite has cost 50 cts. per ton and should have cost only 25 cts. which would mean that we should have to leave ore standing in the mine which under other circumstances could be mined at a profit. Fuse, caps, candles, steel, etc., are all subject to the same attention. There is only one possible system under which this end can be obtained and that is to transfer the whole business of buying and contracting for supplies to the mine office, where there is a man whose duty it is to attend to all such details. The success or failure of the mine depends very largely on this point, for no man who has a reputation at stake will take hold unless it is conceded.

In conclusion I would say that whilst I have been unable to give the full details that would be possible in another 3 mos., I think that sufficient has been written to show that I have confidence in the future of the mine. There is rich ore in the mine, but as a whole it is a low grade proposition and must be handled as such. As to reserves it is well to remember that whilst they are still small, 9 mos. ago there were none at all, and the work which is necessary to open up more is already well advanced.

The mine is now I hope on the high road towards the dividend paying stage and I therefore resign from its management with feelings of professional satisfaction.

ORIENTAL CONSTRUCTION COMPANY

The Oriental Construction Company has taken out incorporation papers and will in a short time be known as the Oriental Construction Company, Ltd. The capital stock is $200,000, none of which is offered for sale. Representatives of the company have been in Manila for several weeks looking into the possibilities of the various proposed public works which will be inaugurated during this year, and while their work has up to the present been confined chiefly to China, it is the intention now, to open an office in Manila and reach out for a share of the many projects proposed or now under way in the Philippine Islands. The office will temporarily be located in the McCullough Building and Mr. McCullough, who is one of the Directors of the Company, will attend to business matters until the regular staff will be sent over from the Head Office at Hongkong.

PROPOSALS AND CONTRACTS FOR THE GRAVITY WATER SUPPLY AND SEWER SYSTEMS, MANILA

Proposals to furnish material and construct a gravity water supply system for Manila, P. I., were submitted to the Municipal Board of this city at noon, January 2d, (Mr. J. F. Case, M. Am. Soc. C. E., Chief Engineer, Department of Sewer and Waterworks construction). There were six bids in all, offered by the following engineering and contracting concerns:—

J. G. White & Co. (Inc.), New York and Manila; Atlantic, Gulf and Pacific Company (Inc.), New York and Manila; Schaw-Batcher Company, Sacramento, Cal.; Matson, Lord and Belser Company, San Francisco and Honolulu; Delmar W. Smith, Manila, and H. W. Peabody & Co., New York and Manila.

The bids of the four companies first named covered the entire work as a whole and by sections, the aggregate total of their respective bids being as follows, all amounts expressed in United States currency:—

J. G. White & Co. (Inc.)	$1,196,853.50
Atlantic, Gulf and Pacific Company	1,071,940.00
Schaw-Batcher Company	1,067,032.00
Matson, Lord and Belser Company	1,040,729.35

Delmar W. Smith's bid covered all the work with the exception of furnishing steel plates and steel rivets and the manufacture and laying of steel pipe, the total amount of his bid being $754,090. H. W. Peabody & Co.'s bid was confined to furnishing steel plates and rivets, and involved $99,900.31. The general specifications under which the bids were submitted contained a clause to the effect that the work called for "will preferably be let as a whole, but may be let separately in (the following) divisions if deemed advantageous to the city." While the bid of J. G. White & Co. appears to be something like $120,000, in round figures, higher than the next highest bid on the whole work, there was a clause in that firm's proposal which submitted that if the contract for the whole work was given to it, the firm would make a reduction of $100,000 from the cost in the bid. This brings the actual bid of Messrs. J. G. White & Co. on the whole work down to $1,096,853.50, and places that firm's consolidated proposal within reasonable range of the next highest proposal.

The proposal of the Atlantic, Gulf and Pacific Company contained a clause to the effect that if it were awarded the contract for the construction of the dam, separately, the sum of $72,000 should be added to its bid on Section A.

Owing to a complication which arose over the proposal of Mr. W. J. Schmidt in behalf of the Schaw-Batcher Company, the final award of the contracts was delayed until the afternoon of January 9th. Then the matter was finally disposed of. In the meantime the Municipal Board learned upon investigation that Mr. Schmidt had no authority whatever to bid in the name of the Schaw-Batcher Company and that the Sacramento concern positively refused to sign any contract with the city which might be secured by Mr. Schmidt. The company's arrangement with him covered selling pipe only In view of this the board rejected the proposal submitted by Mr. Schmidt, and then adopted the following resolution:—

"That the bids for the construction of the gravity water supply for the City of Manila be accepted and contracts awarded in accordance with the following schedule: For the construction of the dam (Section A) and reservoir (Section E), to the Matson, Lord and Belser Company; for furnishing steel plates and rivets (Section B), to H. W. Peabody & Co.; the manufacture and laying of steel pipe (Section C) and the construction of the tunnel (Section D), to the Atlantic, Gulf and Pacific Company."

As the awards now stand the entire work will cost the city $1,025,810.76, apportioned to the several sections distributed among the contractors, as follows:—

Section A	$241,510.25
" B	99,900.31
" C	281,935.00
" D	179,987.50
" E	222,477.70

The estimates of the bidding contractors as submitted in their proposals were a high compliment to Chief Engineer Case's thorough technical knowledge of the proposed work as shown in his estimate of the cost of the new water supply construction to the city. His estimate was $1,104,000 or only $63,000 higher than the lowest bid for the entire system. Throughout the entire bidding Mr. Case had to deal with most competent engineers whose years of experience in estimating just such work was focussed upon the position held by Mr. Case. Some persons believe that the whole contract should have gone to the Matson, Lord and Belser Company, it being the lowest bidder on the whole work, but the chief engineer decided that it would be more advantageous to the city to let sectional contracts, and in the Municipal Board so doing it is estimated that the municipality has saved in round figures about $15,000 on the manufacture and laying of steel pipe and the construction of the tunnel alone. Originally the contract for the manufacture and laying of steel pipe was given to the Schaw-Batcher Company on figures submitted by Mr. Schmidt, but when it was discovered that that gentleman had no authority to involve his company in a contract, this section of the work was transferred to the Atlantic, Gulf and Pacific Company, which was the next lowest bidder for same. On the opposite page details of the bids are given in form for ready reference and comparison.

PROPOSALS FOR SEWER CONSTRUCTION

The Atlantic, Gulf and Pacific Company, Inc., was the successful bidder for the contract to construct the sewer system for the City of Manila, P. I. The estimate of the cost of this work, made by the Chief Engineer, Department of Waterworks and Sewer Construction, was $1,600,900 gold, and the bid of the Atlantic, Gulf and Pacific Company totalled up to $1,631,053.20, or $30,153.20 in excess of Mr Case's estimate.

There were two other proposals presented to the Municipal Board for consideration—one from the Matson, Lord and Belser Company, amounting to $1,650,789.82, and the other from the Colonial Construction Company, amounting to $1,701,591.10. The Colonial Construction Company is a branch of a Kansas City sewer contracting firm organized in Manila for the purpose of bidding on this work, and was represented at the opening of the proposals by Delmar W. Smith. The bids were opened at 12 o'clock (noon), January 12th.

Each bid was composed of forty-eight separate items and each item was separately bid on. The first important item in which any great difference was noted in the bids was the section relative to the piles. The Atlantic Gulf and Pacific Company won here easily on account of its greater facilities and the machinery it has already on the spot suitable for pile driving. There are 61,000 lin. ft. of piling to be supplied. The Atlantic Gulf people offered this piling at the rate of 75 cts. per lin. yd., or $45,750. The Matson, Lord and Belser Company was the next lowest bidder with an offer of $54,920, or 89 cts., and the Colonial Construction Company made it 99 cts. per lin. ft., or $60,390.

For capping and driving piles, the Matson, Lord and Belser Company offered the construction for $101.25 per 1,000 ft., the bid of the Atlantic, Gulf and Pacific Company being $60 per 1,000 ft.

Another item in which there was a considerable difference in bids was in the laying pipes across the Pasig River. The bid of the Atlantic, Gulf and Pacific Company was $30 per ft.; that of Matson, Lord and Belser Company, $50, and the Colonial Construction Company $38.71.

For the 330,000 yds. of excavation the bid of the Atlantic, Gulf and Pacific Company was $1.59 per cu. yd., or $52,470; that of the Colonial Construction Company $1.69 per cu. yd., or $55,770, and that of the Matson, Lord and Belser Company $1.76 per cu. yd., or $58,080.

For the concrete work the Matson, Lord aud Belser people were by far the lowest bidders. Of this work there is 19,600 yds. to be done and this company offered to do it for $8.86 per cu. yd., or $172,656; the Atlantic, Gulf and Pacific Company $10 per cu. yd., or $196,000, and the Colonial Construction Company at $14.90, or $292,040.

For the supply of the 164,480 ft. of 8-in. iron piping the Atlantic, Gulf and Pacific Company bid 60 cts. per ft., the Colonial Construction Company 67 cts., and the Matson, Lord and Belser Company 73 cts.

Details of the bids are to be found on page 212 of this issue.

JAPAN'S BUDGET, 1905-6

Following is a condensed statement of Japan's proposed finances for the current fiscal year:—**Ordinary Budget**—Ordinary revenue, -Y-227,109,280; extraordinary revenue, -Y-19,949,714. Total, -Y-247,058,994. Ordinary expenditure, -Y-182,044,344; extraordinary expenditure, Y-53,000,522. Total, -Y-235,044,866. Balance (surplus of revenue), -Y-12,014,128. **War Budget**—Revenue for war taxes, -Y-163,459,947; extraordinary revenue concerning the war, -Y-9,898,058. Total, -Y-173,358,005. **Expenditure**—Expenditure concerning the war, -Y-173,438,280; extraordinary expenditure concerning the war, -Y-81,606,591. Total, -Y-255,044,871. Balance (deficit of revenue), -Y-81,686,876. **Resources for Making Good the Deficit**—Surplus in Ordinary Budget, -Y-12,014,128; surplus over the ordinary expenditure of the War Office in the Ordinary Budget, -Y-3,145,711; loans to be issued, -Y-36,541,165. Total expenditures of Ordinary and War Budgets, -Y-490,089,747. **Further Expenditures**—Withdrawal of the field army, -Y-380,000,000; further expenditure of the navy, -Y-20,000,000; gifts to soldiers and sailors, -Y-150,000,000. Total, -Y-550,000,000. As extra resources to meet the expenditure, the unexpended balance of the proceeds of the loans issued at London, amounting to -Y-150,000,000 is available. The gifts to soldiers and sailors amounting to -Y-150,000,000 are to be paid in loan bonds. The total of the above two sums, -Y-300,000,000 being subtracted from -Y-550,000,000, there remains -Y-250,000,000 which will be raised by issuing domestic loans, as is the case with the sum of -Y-660,000,000 odd mentioned in connection with the War Budget.

REVIEW

The initial number of *The Philippine Journal of Science* has come to our exchange table from the Director of the Bureau of Science, and we find that it contains a volume of most interesting matter covering certain scientific research which has been pursued by the specialists in that bureau. In his introductory remarks Paul C. Freer, M. D., Ph. D., Director of the Bureau of Science and editor of *The Journal*, says that "this periodical will contain original articles by members of the bureau staff as well as by others who, in the Philippine Islands or adjacent countries of the Orient, are doing scientific work of the proper character. *The Journal* will thus have the unique function of expressing the united scientific results achieved in contiguous countries situated in the Tropics. With the growing interest which is being taken not only in tropical medicine, but in the agricultural and mineral resources of these regions, it seems certain that a publication of the character which is proposed will secure a large number of readers." We extend to *The Philippine Journal of Science* a most cordial welcome to the field of the Fourth Estate in the Orient. The superior excellence of the first number can not help but appeal to the scientific investigators all over the Far East. It is finely printed, artistically arranged and well illustrated. Probably the most interesting papers from a commercial and industrial standpoint which appears in this issue are those *On the Water Relations of the Cocoanut, Palm*, by Mr. Edward Bingham Copeland, of the botanical section of the biological laboratory, Bureau of Science, and *The Cocoanut and its Relation to the Production of Cocoanut Oil*, by Mr. Herbert S. Walker, of the chemical laboratory, Bureau of Science. A review of the latter paper which deals with the commercial phase of the cocoanut, will be found on other pages of this issue of THE FAR EASTERN REVIEW.

Bids Opened at Manila, Philippine Islands, January 2d, 1906, by the Municipal Board, for Furnishing Material for and the Construction of a Gravity Water Supply for the City.

(J. F. CASE, M. Am. Soc. C. E., Chief Engineer, Department of Sewer and Waterworks Construction)

Contract A.—Dam.

Item	Unit	Quantity	J. G. WHITE & CO. NEW YORK-MANILA.		MATSON, LORD & BELSER CO. SAN FRANCISCO-HONOLULU.		ATLANTIC, GULF & PACIFIC CO. NEW YORK-MANILA.		SCHAW-BATCHER COMPANY. SACRAMENTO, CAL.		DELMAR W. SMITH. MANILA.		H. W. PEABODY & CO. NEW YORK-MANILA.	
			Price	Amount	Price	Amount	Price	Amount	Price	Amount	Price	Amount	Price	Amount
1—Earth excavation,...... Class A.	cub. yd.	1,000	0.77	$ 770.00	0.518	$ 518 00	0 50	$ 500.00	0.50	$ 500 00	0.43	$ 430.00		
2—Earth excavation,...... Class B.	"	500	1.03	515.00	1.23	615.00	2.00	1,000 00	0.50	250.00	0.60	300.00		
3—Loose-rock excavation. Class C.	"	1,600	1.54	2,464 00	1.18	1,888 00	0.50	800.00	0.75	1,200.00	0.70	1,120.00		
4—Loose-rock excavation. Class D.	"	400	1.72	688.00	2.07	828 00	2.00	800.00	0.75	300.00	1.00	400 00		
5—Solid-rock excavation. Class E.	"	11,000	1.92	21,120.00	34.85	38,335.00	1.00	11,000.00	2 00	22,000.00	1.95	21,150.00		
6—Solid-rock excavation. Class F.	"	500	2.28	1,140 00	4.05	2,025.00	4.00	2,000.00	3 00	1,500.00	2.70	1,350.00		
7—Solid-rock excavation without blasting, Class G.	"	500	12.25	6,125.00	8.15	4 075.00	4.00	2,000 00	4.00	2,000.00	4 50	2,250.00		
8—Rubble concrete masonry	"	23,000	7.00	161,000 00	7.10	163,300 00	7.85	180,550 00	9 50	218,500.00	9.90	227,700.00		
9—Facework of rubble concrete masonry	sq. yd.	3,600	27.12	97,632 00	3.19	11,484.00	5.00	18,000.00	3.00	10,800 00	3.00	10,800 00		
10—Riprap in place........	cub. yd.	1,200	3 50	4,200.00	2.75	3,300 00	2.00	2,400.00	1.00	1,200.00	1.25	1,500 00		
11—Portland cement concrete masonry, 1:2½:5	"	300	11.46	3,438.00	11.75	3,525.00	7.00	2,100.00	12.00	3,600 00	12.00	3,600.00		
12—Concrete gate well lining	"	206	14.00	2,884.00	14 35	2,956.10	10.00	2,060.00	12.00	2,472 00	12.00	2,472.00		
13—Brick masonry gate well lining	"	206	23.00	4,882.20	30.75	6,334.50			14.00	2,884.00	18.00	3,708.00		
14—Gatehouse at dam, one, complete.				16,000 00		6,480.00		5,000.00		9,000 00		6,900.00		
15—Hauling, caring for, placing iron, etc.	ton	45	38.50	1,732.50	48 47	2.181.15	40.00	1,800 00	20.00	900.00	18 00	810 00		
Total omitting item 12				$ 321,706 70		$ 244,888.65		$		$ 274,634 00		$ 282,318.00		
" " " 13				$ 319,708.50		* $ 241,510.25		† $ 230,010.00		$ 274,222 00		$ 281,082.00		

Contract B.—Furnishing steel plates and rivets.

Item	Unit	Quantity	J. G. White & Co. Price	Amount	Matson, Lord & Belser Co. Price	Amount	Atlantic, Gulf & Pacific Co. Price	Amount	Schaw-Batcher Company Price	Amount	Delmar W. Smith Price	Amount	H. W. Peabody & Co. Price	Amount
18—Steel plates............	lb.	5,300,000	0.02	$ 106,000.00	0.0184	$ 97,520.00	0.0197	$ 101,410 00	0.02	$ 106,000.00			.017836	$ 94,530 80
19—Steel rivets	"	155,00	0.05¾	8,912.50	0.03	4,650.00	0.036	5,580.00	0.03½	5,425.00			.034642	5,369 51
Total....................				$ 114,912.50		$ 102,170.00		$ 109,990 00		$ 111,425.00				* $ 99,900.31

Contract C.—Manufacturing and laying steel pipe.

Item	Unit	Quantity	J. G. White & Co. Price	Amount	Matson, Lord & Belser Co. Price	Amount	Atlantic, Gulf & Pacific Co. Price	Amount	Schaw-Batcher Company Price	Amount	Delmar W. Smith Price	Amount	H. W. Peabody & Co. Price	Amount
20—Earth excavation and refilling	cub. yd.	58,500	0.78	$ 45,630.00	0.506	$ 29,601.00	0.61	$ 35,685.00	0 50	$ 29,250.00				
21—Loose-rock excavation and refilling	"	1,000	1.24	1,240.00	0.60¾	607.50	1 00	1,000.00	1.00	1,000 00				
22—Solid-rock excavation and refilling	"	9,000	2.29	20,610 00	1.48½	13,365.00	1.50	13,500.00	1.90	17,100.00				
23—Adobe-stone excavation and refilling	"	7,500	1.18	8 850.00	1.21½	9,112 50	1.00	7,500.00	1.50	11,250.00				
24—Manufacturing, etc, 42" steel pipe	lineal foot	55,800	3.56	198,648 00	3 82	213,156.00	3.75	209,250.00	3 00	167,400.00				
25—Furnishing, etc, 36" C. I. pipe under Mariquina river	"	450	24.50	11,025.00	46.62	20,979.00	20.00	9,000.00	16 00	7,200.00				
26—Furnishing and laying 6" waste pipe, No. 14 B.W.G.	"	1,000	.65	650.00	3.37½	3,375.00	0.50	500.00	1.00	1,000.00				
27—Portland cement concrete masonry 1:2½:5	cub. yd.	200	9.30	1,860.00	13.75	2,750.00	20.00	4,000 00	10 00	2,000.00				
28—Portland cement concrete masonry 1:4:10	"	150	6 68	1,002.00	8.80	1,320.00	10.00	1,500.00	10.00	1,500.00				
28a—Hauling Iron, etc.	ton		40 00		48.47		40.00		20.00					
Total....................				$ 289,515.00		$ 294,266.00		* $ 281,935.00		† $ 237,700.00				

Contract D.—Tunnel.

Item	Unit	Quantity	J. G. White & Co. Price	Amount	Matson, Lord & Belser Co. Price	Amount	Atlantic, Gulf & Pacific Co. Price	Amount	Schaw-Batcher Company Price	Amount	Delmar W. Smith Price	Amount	H. W. Peabody & Co. Price	Amount
29—Earth excavation in open trench	cub. yd.	1,050	.78	$ 819.00	0,69	$ 724 50	0.75	$ 787.50	0.50	$ 525.00	0.30	$ 315.00		
30—Borrowed earth for embankment	"	16,000	.78	12,480.00	0.55	8,800.00	0 75	12,000.00	0 50	8,000.00	0.50	8,000 00		
31—Rock excavation in open trench	"	2,400	4.35	10,440.00	1.24	2,976.00	2 00	4,800.00	2.00	4,800.00	1.70	4,080.00		
32—Tunnel excavation.....	"	17,500	6.10	106,750.00	6.10	106,750.00	6.70	117,250 00	6.50	113,750.00	5.90	103,250.00		
33—Concrete lining for tunnel	"	3,500	12.35	43,225.00	10.00	35,000.00	6 00	21,000.00	12.00	42,000 00	11.50	50,750.00		
34—Plaster coat on unlined sections	sq. yd.	37,500	40	15,000.00	0.63	23,625.00	0.50	18,750 00	0.30	11,250 00	0.50	18,750,00		
35—Concrete masonry for chambers, culverts etc	cub. yd.	270	12.35	3,334.50	9 00	2,430 00	20.00	5,400.00	12.00	3,240 00	12.00	3,240 00		
Total...........				$ 192,048.50		$ 180,305 50		* $ 179,987 50		$ 183,565 00		$ 188,385.00		

Contract E.—Reservoir and gatehouse.

Item	Unit	Quantity	J. G. White & Co. Price	Amount	Matson, Lord & Belser Co. Price	Amount	Atlantic, Gulf & Pacific Co. Price	Amount	Schaw-Batcher Company Price	Amount	Delmar W. Smith Price	Amount	H. W. Peabody & Co. Price	Amount
36—Earth excavation.......	cub. yd.	29,000	.33	$ 9,570 00	0.64	$ 18,560 00	0.20	$ 5,800.00	0.50	$ 14,500 00	0.30	$ 8,700 00		
37—Rock excavation	"	235,000	.95	223,250.00	0.64	150,400.00	0 89¼	209,737.50	0 85	199,750.00	0 95	223,250.00		
38—Plaster coat for reservoir	sq. yd.	43,500	.38	16,530.00	0.55	23,925.00	0.60	26,100 00	0 10	4,350 00	0.35	15,225 00		
39—Concrete masonry lining	cub. yd	200	8.48	1,696 00	9 18	1,836.00	12.00	2,400 00	10 00	2,000.00	10 50	2,100 00		
40—Concrete masonry in parapet walls	"	325	8.70	2,827.50	9.20	2,990 00	10.00	3,250 00	12.00	3,900.00	12.00	3,900.00		
41—Concrete masonry in gate chambers and core walls	"	1,650	7.67	12,655.50	8.75	14,437 50	10 00	16,500.00	12.00	19,800 00	14 50	23,925.00		
42—Gatehouse at reservoir, one complete				12,500.00		8,640.00		5,000 00		15,000.00		6,500.00		
43—Hauling, etc., iron & metal work in gatehouse and reservoir	ton	41	40.00	1,640.00	41.20	1,689 20	30.00	1,230.00	20.00	820.00	25.00	1,025.00		
Total....................				$ 280,669 00		* $ 222,477.70		$ 270,017.50		$ 260.120.00		284,625.00		
[illegible]otal				$ 1,106,852.50		$ 1,040,129.35		$1,071,910.00		$ 1,067,032.00		$ [illegible]		$ 99,900.31

Details of Proposals Opened at Noon, January 12th, 1906, by the Municipal Board of Manila, Philippine Islands, for the Construction of a System of Sewers and Appurtenances for the City.

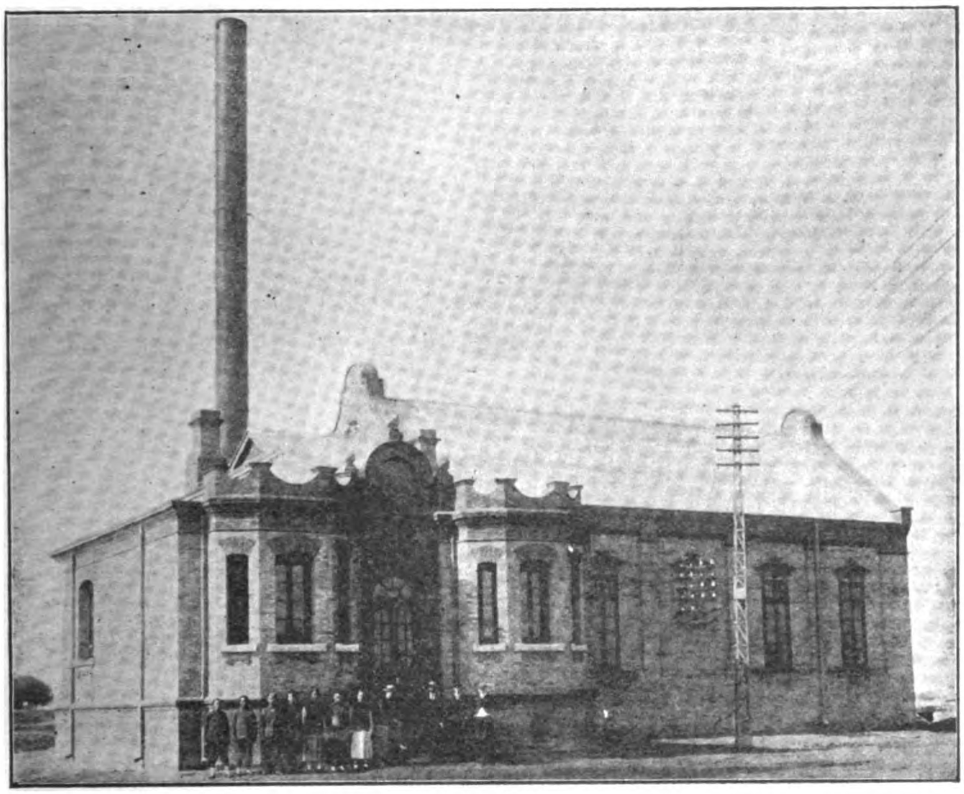
(J. F. CASE, M. Am. Soc. C. E., Chief Engineer, Department of Waterworks and Sewer Construction)

QUANTITIES		ATLANTIC, GULF AND PACIFIC CO. NEW YORK-MANILA	MATSON, LORD AND BELSER CO. S. FRANCISCO-HONOLULU	COLONIAL CONSTRUCTION CO. KANSAS CITY-MANILA
16" C. I. Pipe, 4 Specials, 1 Bend [¼] 156'	11 tons.	$ 40.00	$ 40.00	$ 49.75
18" " , 8 " 3 " [¼] 310'	27 "	40.00	41.28	49.75
24" " , 3 Bends [¼] 70'	9 "	40.00	49.41	49.75
24" " , flexible joint, 16 Specials 1120'	219 "	65.00	56.21	49.75
30" " 136'	22 "	40.00	38.96	49.75
36" " 576'	131 "	40.00	35.20	49.75
42" " , Cap, 3 Specials 6500'	1,924 "	40.00	35.31	49.75
Concrete Masonry at outlet to force main	84 cu. yds.	20.00	72.39	23.75
Piling for outlet section	61,000 lin. feet	0.75	0.89	0.99
Lumber for caps and flooring for outlet section	40,000 feet B. M.	60.00	101.25	87.00
42" C. I. Pipe and Specials in outlet section	6,500 lin. feet	20.00	15.00	12.50
24" " , flexible joint and Specials, River crossing.	1,308 "	30.00	50.00	38.71
C. I. Pipe and Specials, Binondo Estero crossing	103 "	40.00	26.22	10.13
" " S. Jacinto " "	102 "	40.00	26.22	8.78
" " S. Miguel " "	88 "	40.00	26.22	10.13
" Tanduay Estero crossing	84 "	40.00	26.22	9.46
" Luneta " "	144 "	40.00	26.22	9.46
" and Special Trozo Estero crossing	223 "	40.00	22.46	10.13
" " " Meisic " "	213 "	40.00	22.46	10.13
" " " Bilibid " "	156 "	40.00	22.46	9.46
" " " de la Reyna " "	212 "	40.00	22.46	10.13
Earth excavation	330,000 cu. yds.	1.59	1.76	1.69
Concrete Masonry, except outlet section, arches of main sewers and flush tanks	19,600 "	10.00	8.86	14.90
Concrete Masonry in arches of main sewers	3,860 "	11.00	9.83	15.75
Brick Masonry, except in arches of main sewers and manholes	3,040 "	15.00	21.60	19.78
Brick Masonry in arches of main sewers	3,970 "	20.00	17.50	19.78
" " in manholes	1,120 "	40.00	22.50	19.78
Concrete invert blocks	18,500 lin. feet	0.50	0.4550	0.74
24" diam. terra-cotta pipe	1,620 "	2.68	4.28	4.54
21" " " " "	8,860 "	3.17	3.60	2.90
18" " " " "	8,560 "	2.10	2.65	2.25
15" " " " "	8,800 "	1.63	1.99	1.56
12" " " " "	7,350 "	1.06	1.36	1.03
10" " " " "	18,040 "	0.86	1.06	0.84
8" " " " "	169,480 "	0.60	0.735	0.57
Subdrain, 6" diam. terra-cotta pipe	19,400 "	0.44	0.455	0.36
6" terra-cotta stand pipe	9,900 "	0.44	0.47	0.46
6" " " V-branches	3,700 No.	1.44	1.71	1.69
6" " " ¼ and ⅛ bends	3,600 "	1.23	1.33	1.00
Foundation lumber under main sewers	570,000 feet B. M.	50.00	46.10	43.00
" " " terra-cotta and C. I. pipe sewers	300,000 "	30.00	30.00	30.00
Sheeting and bracing lumber left in trench	650,000 "	25.00	25.00	25.00
Gravel in place around 6" subdrain	550 cu. yds.	1.50	2.35	2.00
2' manhole frames and covers	840 No.	15.00	9.35	12.50
3' C. I " " " "	10 "	25.00	19.00	25.00
Flush tanks	370 "	100.00	65.00	55.00
4" terra cotta pipe	1,200 lin. feet	0.32	0.30	0.25
4" " " bends [¼]	400 No.	0.95	0.75	0.50
TOTAL		$1,631,053.20	$1,650,789.82	$1,701,591.10

Modern and Complete Electric Lighting and Power Plant, Tientsin, North China

(Installed by Messrs. ARNHOLD, KARBERG CO., & Contractors.)

Messrs. Arnhold, Karberg & Co., the prominent general agents in China for German, British and American machinery of every description, and general managers of the New Engineering and Shipbuilding Works, Ltd., of Shanghai, recently completed the installation, at Tientsin, North China, of a modern and complete electric lighting and power plant for the Tientsin Gas and Electric Light Company, Ltd. The managing director of this company is Mr. C. Poulsen. Mr. A. J. C. Waterland is its engineer-in-chief.



CENTRAL STATION, ELECTRIC LIGHT AND POWER SYSTEM, TIENTSIN

In connection with the plant provision and materials have been secured for the installation of electric fans and heaters, in addition to which arrangements and apparatus are provided in connection with experiments in wireless telegraphy under the System Telefunken, Berlin, for which Messrs. Arnhold, Karberg & Co. are general agents.

THE CENTRAL STATION.—The electricity works of the Tientsin Gas and Electric Light Company, Ltd., are situated at the end of Bruce-rd in proximity to the canal, in Tientsin, where a large plot of land has been acquired to serve for extensions and other purposes. The Buildings were constructed from designs by Messrs. Arnhold, Karberg & Co., under the supervision of Mr. Howard Ford, architect. They comprise an engine-room 60 ft. long by 30 ft. wide, a boiler-house 60 ft. long by 37 ft. wide, together with a suite of offices for the chief engineer and his assistants. They are of brick of ornamental design, and space has been provided for additional machinery. The chimney is of wrought iron, 4 ft. in diameter, and 85 ft. high.

STEAM DYNAMOS.—The generators consist of dynamos constructed by the Electrical Company, Ltd., and are directly coupled to high-speed engines of Messrs. Robey and Co.'s make. The small set is capable of developing 40 kws. at 550 r. p. m., and the two large sets 80 kws. each at 400 r. p. m. Each machine is capable of giving an emergency load of 25 per cent, in excess of the normal load for 2 hrs. without injury. Each engine is provided with steam pressure gauges and forced lubrication. The oiling of all the bearings and working parts is done by a pump driven off the engine shaft and supplied at a pressure of 15 lbs. per sq. in. A speed indicator, also driven off the shaft, indicates the revolutions. As the current is generated in the dynamo it passes through a set of collecting brushes, and thence through insulated cables to the main switchboard.

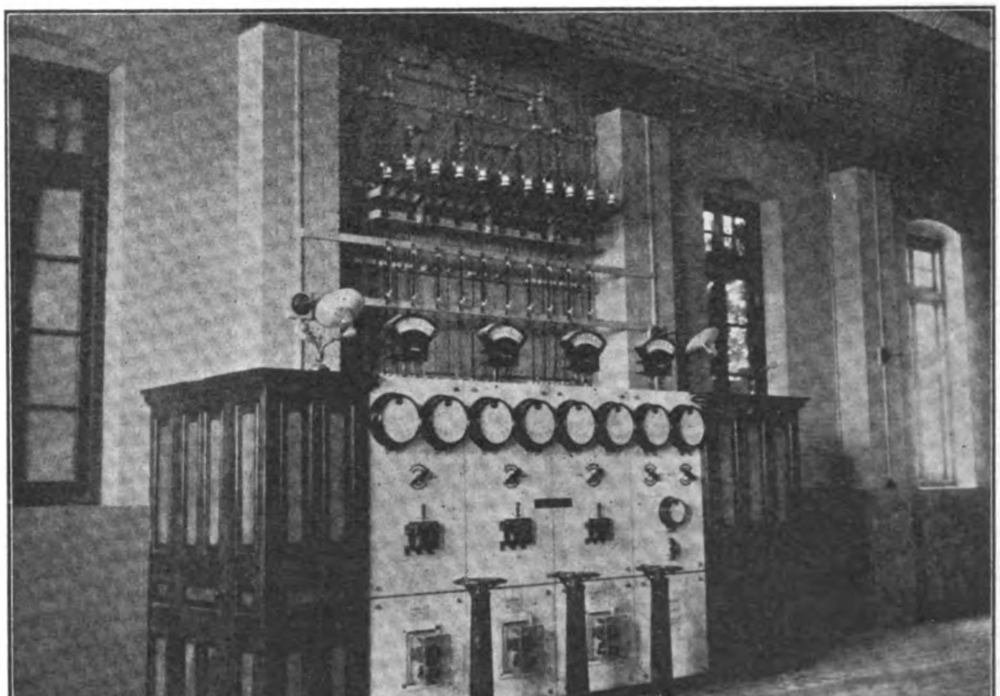
MAIN SWITCHBOARD.—This is built up of white marble mounted on iron supports and enclosed in a polished wood framing. The panels—one for each dynamo and one for the feeders—are provided with all the latest improvements in switches—regulating gear and instruments by which the output of the works is measured and recorded. The main conductors are at their back of the board and connect with the feeder cables through safety fuses. Each feeder is connected to a lightning arrester which is efficiently connected to earth through a large plate outside the building.

OVERHEAD CRANE.—The engine rcom is spanned by a travelling crane capable of lifting 5 tons.

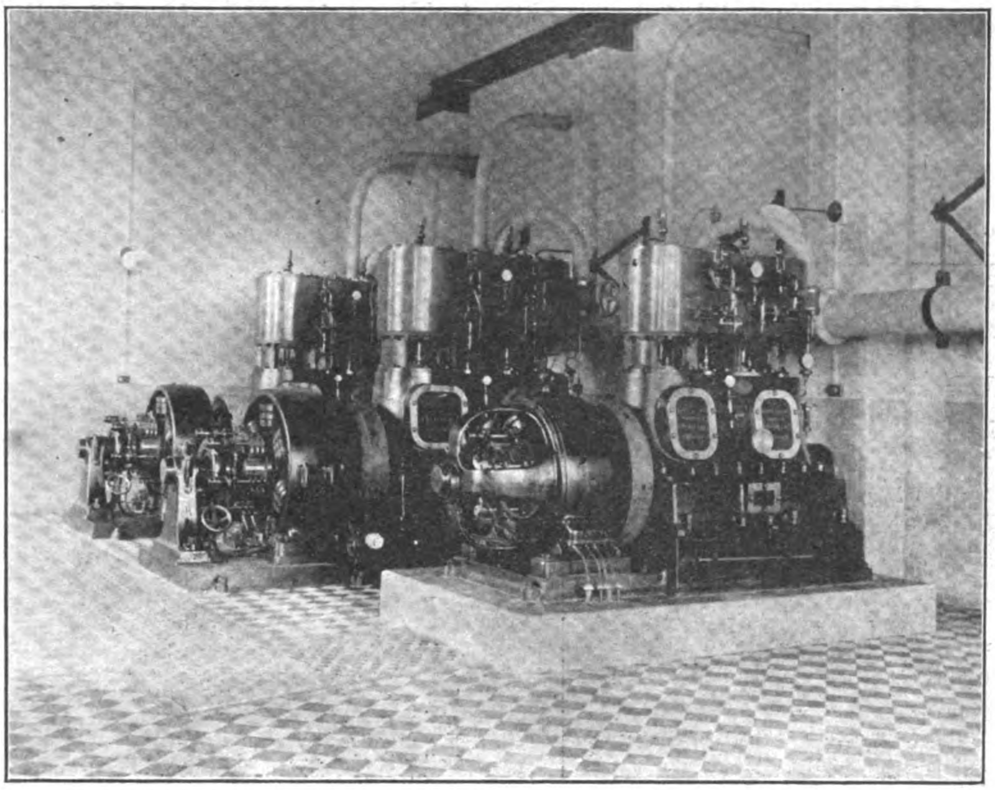
PIPE WORK.—The steam pipes connecting the boilers with the engines are of lapwelded mild steel, and the condensing and exhaust steam pipes are of cast iron.

BOILERS.—The boilers, two in number, are of Messrs. Babcock & Wilcox's well known water-tube type, each capable of evaporating 4200 lbs. of steam per hr. at a pressure of 120 lbs. per sq. in. Each boiler is provided with a 10-in. pressure gauge, two water gauges, and the usual safety valves and accessories. Each boiler is also provided with a soot-cleaning apparatus, the tubes being cleaned of all soot and other deposits by means of a jet of steam applied through a hose. These boilers have a large heating surface, *viz.*, 1619 sq. ft., consuming very little water compared with other types; consequently steam can be raised very rapidly without injury, the average time taken to raise steam being about 30 mins.

ECONOMIZER.—In the main flue leading to the chimney an economizer is provided for raising the temperature of the feed-water by means of the waste gases. The water thus reaches the boiler at a temperature of from 150° to 250°, and effects a saving on the coa bill of from 15 to 20 per cent. The economizer consists of a number of castiron pipes through which the water flows, and in order to keep the pipes clean and free from soot on the external surface, slow moving scrapers are fixed, and



MAIN SWITCHBOARD AT THE CENTRAL STATION



"ELECTRICAL" DYNAMOS, DIRECTLY COUPLED TO HIGH-SPEED ROBEY & CO. ENGINES

these are kept moving up and down by a small steam engine.

FEED PUMPS.—There are two duplex feed pumps of Tangye's make, each capable of pumping 500 galls. of water per hr. against a steam pressure of 160 lbs. per sq. in. These pumps draw their water from a large tank overhead holding 1000 galls. of water. Attached to the pumps is a filter, through which the water passes on its way to the boiler; this removes any oil or other foreign matter detrimental to the life of the boiler.

SURFACE CONDENSER.—This has a surface of 700 sq. ft., and is capable of condensing 7000 lbs. of steam per hr. It is manufactured by the Worthington Pumping Engine Company. It is self-contained, and consists of air and circulating pumps on one bed plate. The cooling water is obtained from a well outside connected with the canal, and the eondensed water is delivered by the air pump into the feed-water tank, and is used for feeding the boilers. Before the exhaust steam enters the condenser it passes through a separator which removes nearly all the oil from the steam, and this oil is removed by a small engine, and can be used for various purposes.

MAINS.—These consist of three distinct types of conductors:—

(1) *Feeders.*—Which run from the power house to different points in the town, where they connect the ordinary distributing mains. These feeder cables are not tapped along their entire lengths and current is supplied to them at such a pressure at the works that by the time it reaches the feeding point it feeds into the distributing main at the normal pressure required by the consumers. Pilot lines are laid back from such feeding point to the Power House to indicate to the attendant the pressure at the various points. (2). *Distributing Mains.*—As their name implies, these convey current along the various streets in which the demand is made by private consumers. The mains are laid in the following streets, and will be extended as the demand warrants it:—Victoria-rd, Taku-rd, Race Course-rd, Davenport-rd, Garden-rd, Elgin-ave, Recreation-rd, Fei Lung-rd, Hsin Yuen-rd, Bristowe-rd, Consular-rd, Canton-rd, Ewo-rd, Kwang Lung-rd, Pao Shun-rd, The Bund, Club-rd, Parkes-rd, Meadows-rd, Council-rd, Cousins-rd, and Dickinson-rd. (3.) *Service Lines*—These are the short lengths connecting the distributing mains with the consumers' premises.

PUBLIC LIGHTING.—The stre et lighting, when complete, will consist of about 250 32 candle-power lamps. These lamps are connected to their own system of mains and controlled in groups from various parts of the town. This arrangement effects great saving in labor and the whole settlement can be lighted in a very short time.

PROGRESS.—The demand which has already been made augurs well for the future of the undertaking. The company is still very busy in its installation department.

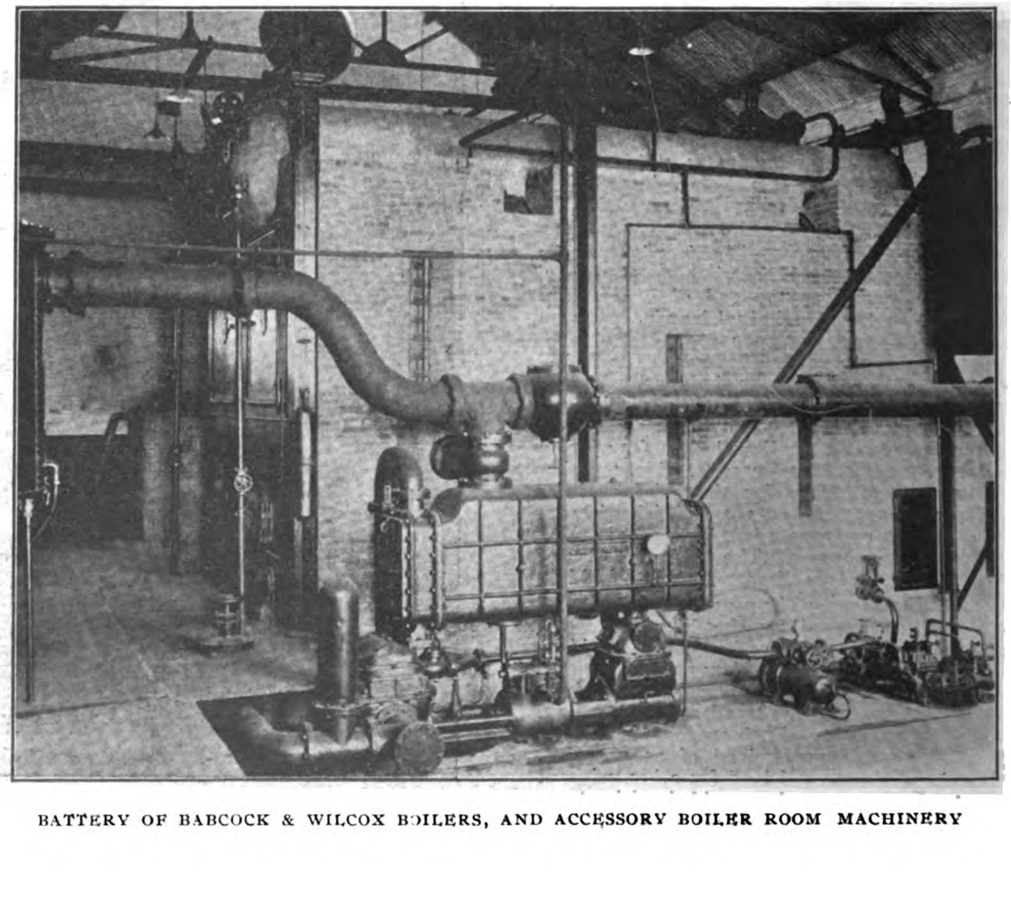
CONTRACTORS.—Messrs. Arnhold, Karberg & Co. are the contractors for the complete system, including buildings, plant, mains, etc. They have given to the enterprising city of Tientsin an electricity plant that will meet the demands of the community for years to come.

FEDERATED MALAY STATES

The reports on the Federated Malay States for 1904 have just been issued by the British Government as a "blue book." They comprise the annual report by the resident-general on the states as a whole, and of reports by the residents on the various states particularly, with a covering dispatch by Sir John Anderson, the high commissioner, dated Singapore, September 6th, 1905. Sir John Anderson, in the course of this dispatch, says in part:—

These reports contain the same record of continuous progress and prosperity that has been repeated with unfailing regularity in previous reports. Since I forwarded the reports for 1903 I have travelled through all the states, and though I had diligently studied all previous reports, I confess that I had formed but a faint conception of the actual extent of the progress which has been achieved during the brief period that has elapsed since British officers first came to the assistance of the native rulers in the administration of their states. Not only have law and order been firmly established throughout the whole area, but so far at any rate as the three western states are concerned, they are better provided with roads and railways, public buildings, and all the usual adjuncts of administration and comforts and amenities of civilization than any of the crown colonies in the empire. The construction and maintenance of roads and railways through a tropical country is always expensive and difficult, and the fact that on an average over 22 ms. a year have been added to railways, and more than double that length to roads entirely from revenue, shows the extraordinary natural wealth of the states.

In Pahang much less progress has been made. It has only had a president since 1888, and the disturbances which characterized its earlier history no doubt retarded its progress to some extent. But the main factor in its slow development has undoubtedly been the difficulty of communications. . . . The main problems in the western states are no longer those of opening up the country, but those attending the growth of towns—water supply, sanitation, lighting, etc., and these are now, with the aid of the local sanitary boards, receiving attention. During my tour through the states I received a deputation of planters at Kuala Lumpor and discussed with them in a friendly and informal way the supply of labor. There appeared to me to be some justification for the complaint, and I arranged that 6,000 of the 8,000 tickets which, under the coolie immigration contract with the British India Company the government has bound itself to take, should be given free to the planter's associations for distribution among their members on the understanding that government would be free to recruit in the states any labor required beyond the number especially imported on its behalf. The arrangement has now been in force for nearly a year, and the planters are quite satisfied, while the government finds no difficulty in maintaining its labor force.



BATTERY OF BABCOCK & WILCOX BOILERS, AND ACCESSORY BOILER ROOM MACHINERY

Commercial Value of the Cocoanut is Enhanced by Scientific Culture of the Palm

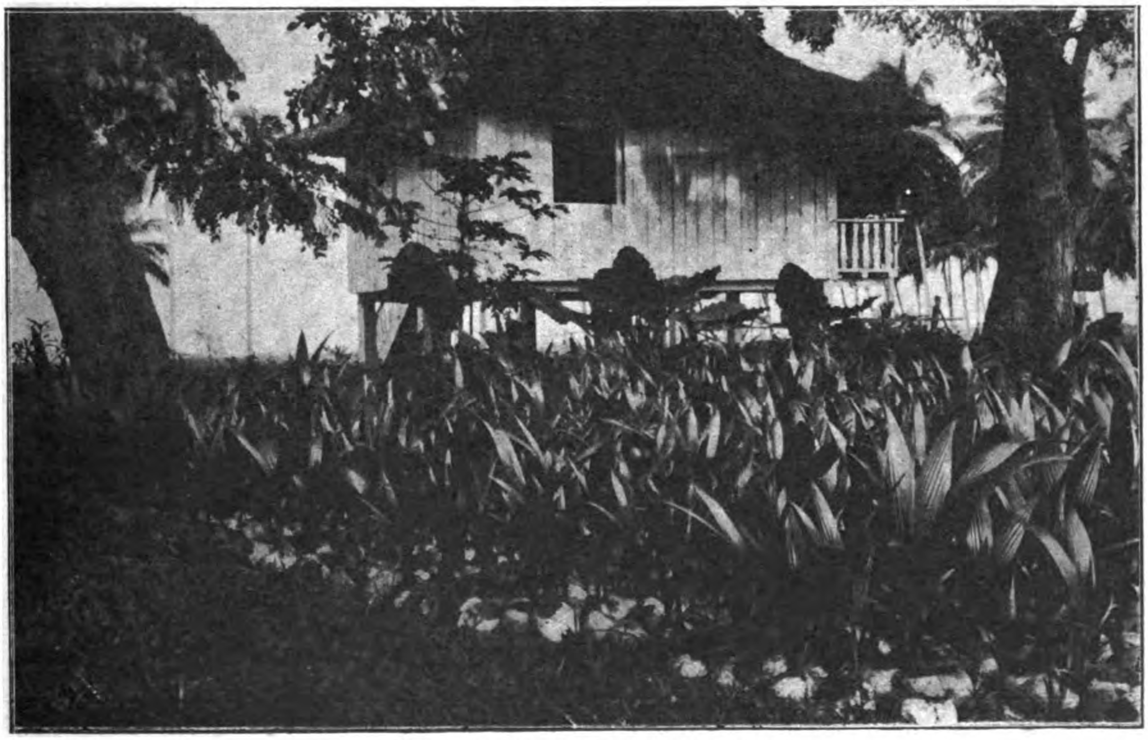
COCOANUT PALMS GROWING ON THE BEACH AT SAN RAMON, SHOWING HABITAT

Mr. Edward Bingham Copeland, a biological expert of the Bureau of Science of the Philippine Islands, having shown in a most interesting and instructive paper published in the initial number of *The Philippine Journal of Science* that judicious fresh-water irrigation is very essential to the thrift and fruit-bearing quality of the cocoanut palm, Mr. Herbert S. Walker, a chemical expert of the same bureau, follows with a paper on *The Cocoanut and Its Relation to the Production of Cocoanut Oil.* From a commercial and industrial standpoint Mr. Walker's paper is a treatise of immense value, although, while Mr. Copeland's contribution discussed the scientific development of the palm under methods of culture, old and new, and the effects of fertilization, transpiration and drought upon the yield, it might be well to set down here the conclusions the latter has arrived at after a thorough investigation of his subject, before taking up the next paper. Mr. Copeland says:—

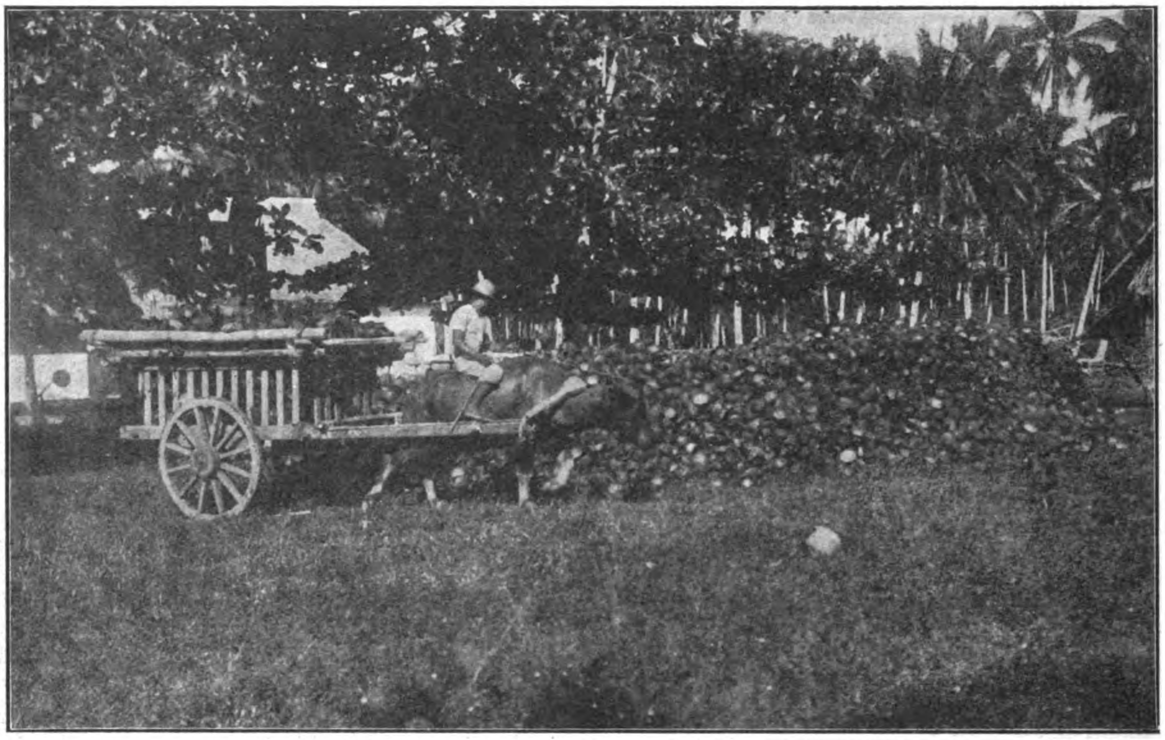
"We have just seen that a considerable supply of water must constantly be at the disposal of the cocoanut, or it will protect itself against injurious desiccation by a partial suspense of its vitality. The necessity of this water as the carrier, in solution, of the plant's mineral and nitrogenous raw food has previously been touched upon. I made no direct experiments in the fertilization of the cocoanut, but it is the unanimous experience of those who are acquainted with the subject that an increase in some of the constituents of its mineral food has a very marked favorable effect on the production of the fruit. At San Ramon certain trees are pointed out as particularly productive because they have long received the waste from the kitchen. The quantity of mineral food which the tree takes is roughly proportional to the amount of water which it absorbs. Increasing the plant's transpiration has, then, the same effect as supplying a fertilizer to the ground. The amount of transpiration can be increased in two ways—by increasing the amount of water at the disposal of the roots and by improving the conditions for its evaporation from the leaves.

"In season of drought the first method does the plant a double service, for the water which is artificially furnished is not only valuable in itself but also because of the substance dissolved in it. However, during other seasons, irrigation may not merely be useless but even very injurious, for ground too wet does not favor the activity of cocoanut roots any more than that which is too dry.

"We have seen that the transpiration of the cocoanut is somewhat accelerated by the wind and greatly so bnty iense illumination. There-



THE NUTS SET OUT IN THE SEEDING BEDS

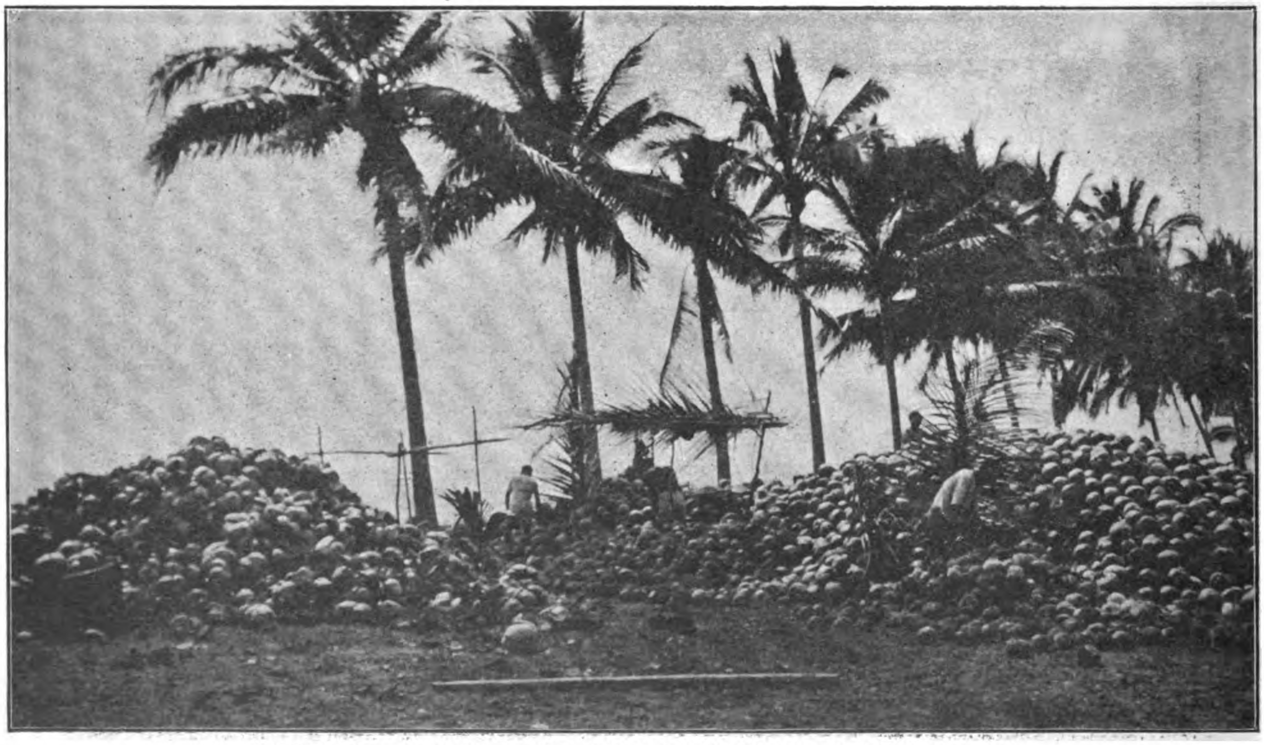


GATHERING COCOANUTS IN PILES NEAR THE DRYING SHEDS

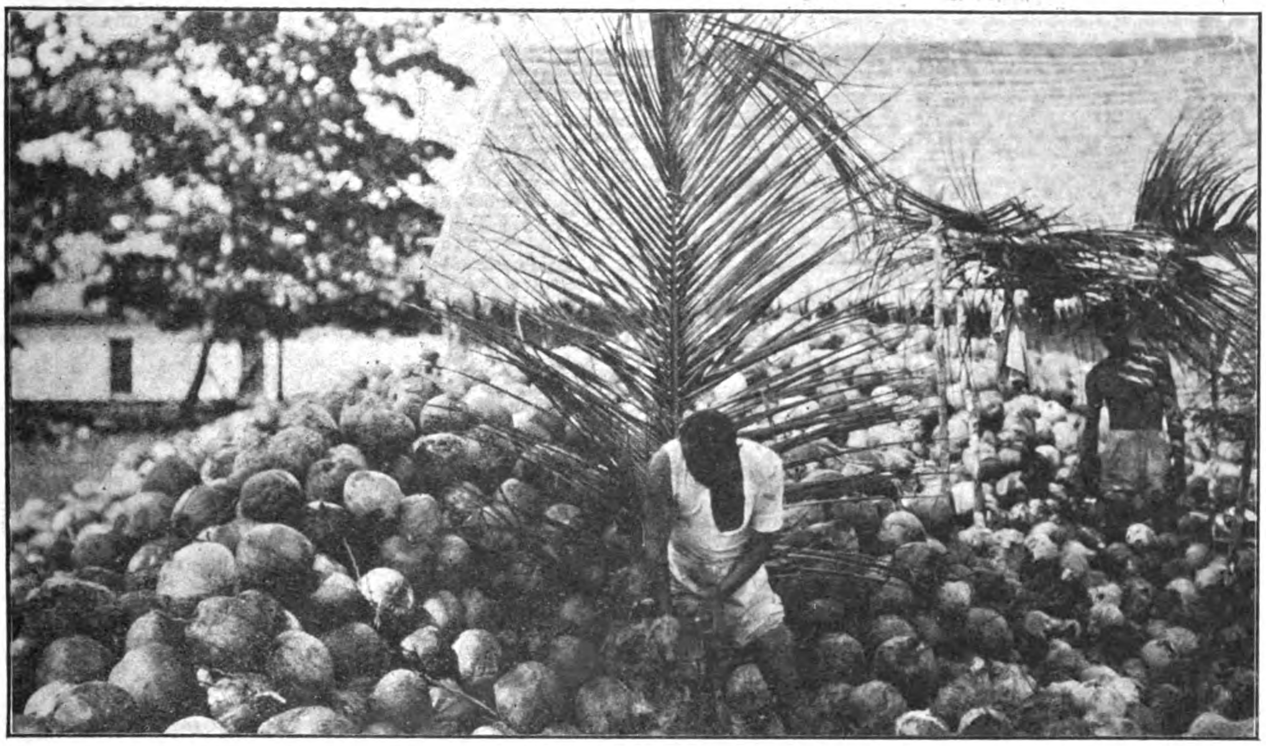
fore, so long as the roots are not in too dry a soil, it is in the plant's interest to be exposed as much as is normally possible to these two agents. On any considerable tract devoted to cocoanut culture this can be done in but one way—by not planting the trees too close together. I have never seen a grove in which the trees were sufficiently far apart so that, unless other conditions were very unfavorable, the trees around the outside were not much more productive than those in the interior. At San Ramon, a considerable proportion of the trees are planted in double rows, one row along each side of a narrow road. In such a row, which contained no nonbearing trees, I found the yield at one cutting to average 22 nuts to the tree. A row of trees along the well-drained bank of a slough yielded an average of 27 nuts, all trees producing. A single tree standing by itself in the open yielded 55 nuts. In the interior of an old grove, the average for the producing trees was about 11, and in the same situation in a large one on the neighboring hacienda of Talisayan the average for bearing trees was only 8; the individuals in the area where this count was made were as a rule about 18 feet apart, their crowns interlaced freely, producing a rather dense shade, and many trees were without ripe nuts.

"I have no doubt that up to a distance of at least 15 meters any increase in the intervals between trees will result in an appreciable advance in the average yield per tree, but by planting beyond the intervals at which the interlacing of roots and of leaves would bring the trees into keen competition for water and light, and would also largely break the wind passing through the crowns, the increase in the yield of nuts for the individual trees would not be commensurate with the area of land in use. In my opinion, the trees in a grove can usually best be placed at intervals of about 9 meters In exposed rows they may well be closer together, and where intense cultivation is economically possible the distance between them may be a little less.

"The natural habitat of the cocoanut is the strand. It is restricted to this because it bears fruit too large to be practically transportable by any other natural agent than the water; and it is adapted thereto by possessing superficial roots which are uninjured by temporary exposure to concentrated solutions, by having a tough, very elastic trunk, and by producing leaves which are not merely tolerant of the most intense insolation and wind but which are unable to work to the best purpose without more light and wind than many plants can endure. As is true for every cultivated plant, it is possible to create for the cocoanut conditions altogether more favorable for its utmost thrift than are ever known to occur in nature. It naturally grows in a "poor" soil—that is, in one in which its mineral and nitrogenous raw food is present in very dilute solution. We can improve its environment in this respect, and can profitably carry this improvement much further than is the general practice at present. But the cocoanut must not be expected to thrive, even in the richest soil and with the best cul-



SORTING AND HUSKING NUTS ON THE BEACH NEAR THE DRYING SHEDS

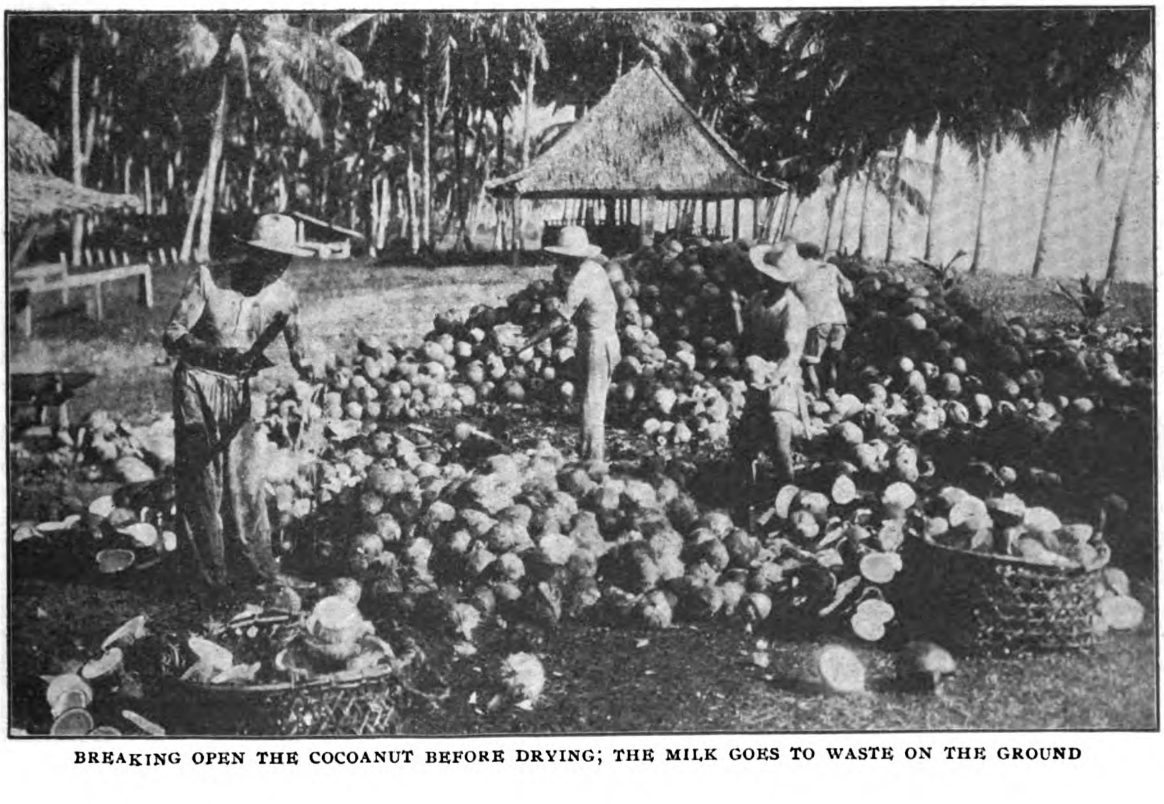


METHOD OF HUSKING THE COCOANUT

tivation, if its supply of light is restricted by other trees or in any other way, or where the air is too still or an adequate supply of water is not always available near the surface of the ground.

"There is another method of increasing the yield of cocoanuts, slower but more permanent than improved cultivation; this is by the selection of seed. I have done nothing with this subject, and only mention it because the results of selection can not appear for many years, and a mistaken method would be long in showing its uselessness. Nuts obviously should be selected for seed from trees conspicuous for the amount or quality of their yield. It is usually not a difficult matter to decide whether or not the tree's superior yield is due to its growing under exceptionally favorable conditions. If it is, it shows how other trees may be made to bear equally well, but there is no reason for selecting the nuts of such a tree for seed; its offspring can not be expected to bear more nuts under ordinary conditions than the parent would have done without its exceptional advantages. The environment is not hereditary. The tree the nuts of which should be used as seed is the one the production of which is great in proportion to its opportunity. A tree bearing regularly 12 nuts to the cutting under conditions which allow its neighbors but 8 should have its nuts saved for seed in preference to those of an individual having 30 nuts among equally productive neighbors."

THE COCOANUT AND ITS RELATION TO THE PRODUCTION OF COCOANUT OIL.—In his investigation of cocoanut production from the standpoint of the quality and quantity of the oil yield, Mr. Walker found that the first problem which presented itself was the influence of the soil in which the trees grow on the yield of nuts, copra, and oil. It had been noticed for a long time that the cocoanut trees growing near the seashore at San Ramon (Government Farm, W. coast of Mindanao, 10 ms. N. of Zamboanga), produced much more fruit than those standing further inland, and it had also been stated that the former trees bear a better quality of nuts than the latter. To determine how far these facts might be accounted for by the greater fertility of the soil near the sea, Mr. Walker made analyses of a number of soils in which cocoanut trees were growing, the samples being taken at the beach as well as further inland, and two at Davao, Mindanao, one sample at the mouth of the Davao River about 50 ft. from the sea, and another at a distance of 50 ft. from the same river about 1 m. inland from the sea, where trees were growing well. Chemically, the result of these analyses showed very little difference between the soils near the sea and those further inland. The latter, contrary to what was supposed, were found to be somewhat superior to the former. From these results it is evident to Mr. Walker that the inferior quality of the inland trees can not be explained by the analytical difference in the soils; neither does the salt from the sea appear to an appreciable extent, even around those trees which are actually growing on the beach.



BREAKING OPEN THE COCOANUT BEFORE DRYING; THE MILK GOES TO WASTE ON THE GROUND

SUN DRYING THE NUTS ON TRAYS

SEEPAGE WATER FURNISHES NUTRITION TO BEACH TREES.—It therefore seems very probable to Mr. Walker that in Son Ramon at least, if not in most plantations along the seacoast, the nutritive material comes not from the soil in which the trees are actually growing but from an inexhaustible supply of water, laden with plant food, which is constantly seeping down from the higher ground towards the ocean. This underground water supply would, in the opinion of Mr. Walker, account for the flourishing condition of trees in sandy soil near the sea, even in times of drought, when individuals farther inland in higher, less permeable ground would be dying for want of water. In the case of the less permeable soils, artificial irrigation during the dry season seems to Mr. Walker to be of the utmost importance, and any addition to the fertility of the soil, either in the form of manure or of a chemical fertilizer, would probably be repaid by an increased yield of fruit. For soil near the sea, under conditions such as exist at San Ramon, irrigation is of course unnecessary except in times of extreme drought, and fertilization would be of doubtful advantage.

THE NUT AND ITS OIL PRODUCTION.—In, studying this phase of the cocoanut subject, Mr. Walker found that one of the first and most important problems which presented itself was to determine the effect of the age and the relative maturity of the nut on the percentage of its various constituents; in other words, to find out the most favorable time for opening a nut to obtain the largest and best yield of copra and of oil. With this end in view analyses were made of several series of ten nuts each with the following results, all weights indicated being in grams, and meat, copra and oil calculated to per cent in nut free from husk:

SERIES I.—Ten nuts, fresh from tree but fairly ripe (all green husks): Average total weight, 2,848; per cent of meat 40.5; of copra 18.9, of oil 12.4.

SERIES II.—Ten nuts, very ripe (dead brown husks), selected from pile of several thousand: Average total weight 2,110, per cent of meat 41.7, of copra 21.7, of oil 13.4.

SERIES III.—Nuts stored 3 mos., just beginning to sprout: Average total weight 2,805, per cent of meat 45.8, of copra 23.5, of oil 14.5.

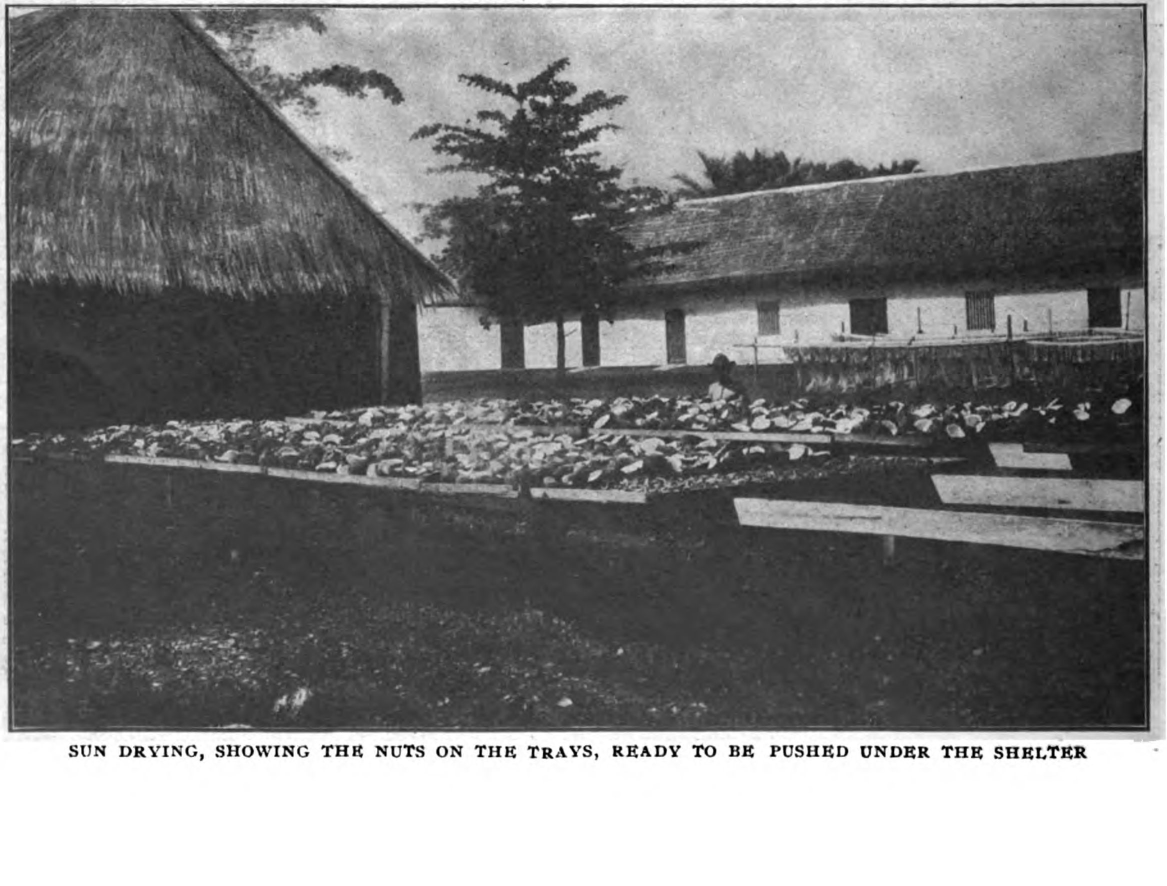
SERIES IV.—Nuts stored 6 mos. which had not sprouted (most nuts of this age have sprouts 20 to 30 centimeters long): Average total weight 2,866, per cent of meat 46.0, of copra 19.5, of oil 12.4.

SERIES V.—Ten nuts not fully ripe, fresh from tree: Average total weight 3,958, per cent of meat 34.4, of copra 11.5, of oil 7.5.

SERIES VI.—Nine nuts from same tree as Series V, but fairly ripe: Average total weight 2,384, per cent of meat 41.7, of copra 21.0, of oil 13.6.

SERIES VII.—Nuts from same tree as Series V, but dead ripe: Average total weight 1,558, per cent of meat 43.8, of copra 23.4, of oil 15.5.

These last three analyses very conclusively show the change which is taking place as the fruit becomes riper. The average percentages of copra and oil, for example, in the nut free from husk in the green fruit, are only 11.5 and 7.5, respectively, but they rise to 21 and 13.9 in the "fairly ripe" nuts, and assume a maximum



SUN DRYING, SHOWING THE NUTS ON THE TRAYS, READY TO BE PUSHED UNDER THE SHELTER

KILN USED FOR DRYING NUTS

of 23.4 and 15.5 in the case of the series which had been allowed completely to ripen while still on the tree. This gain is practically due to an increase in the percentage of meat, which runs 34.4, 41.7, and 43.6 in series V, VI, and VII, respectively, at the expense of milk, but it is also accounted for by the increase of solid matter and loss of water in the former.

SERIES VIII.—Ten thoroughly ripe nuts from one tree (the nuts on this tree all have a green husk until they become "dead ripe," when they change to a dull brown): Average total weight 1,704, per cent of meat 42.8, of copra 20.4, of oil 13.3

SERIES IX.—Ten thoroughly ripe nuts from one tree (these nuts have a golden-yellow color until "dead ripe," when they look like those of Series VIII: Average total weight 1,702, per cent of meat 42.5, of copra 21.6, of oil 13.8.

Very little difference can be observed between these two varieties; the average weight is almost exactly the same. The percentage of husk and shell is somewhat lower in the yellow nuts, but this average to a large extent is counterbalanced by their percentage in milk, so that the amount of meat in the two remains practically the same.

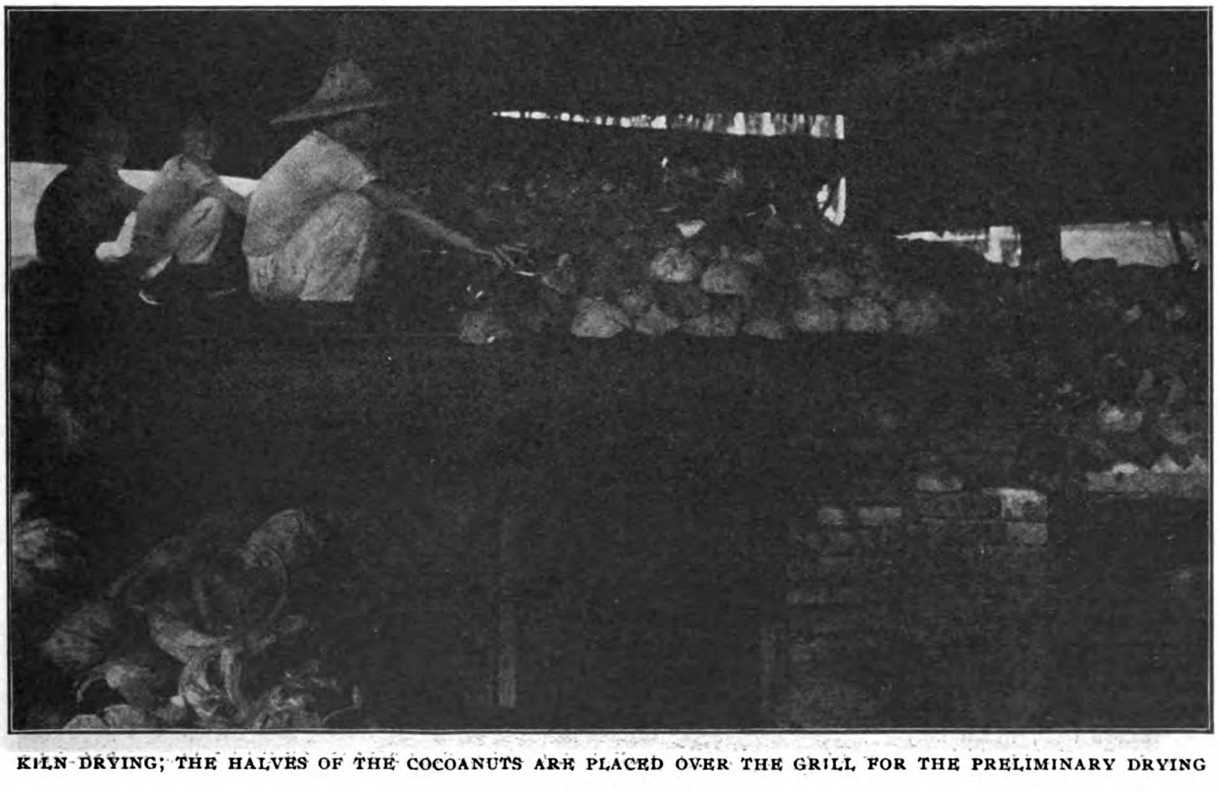
SERIES X.—Ten nuts from a pile of 1,000 taken from trees near the sea: Average total weight 2,811, per cent of meat 42.1, of copra 22.0, of oil 14.7.

SERIES XI.—Ten nuts from a pile of 1,000 taken from trees inland about 1,800 ft.: Average total weight 2,894, per cent of meat 39.8, of copra 19.7, of oil 12.0.

In selecting nuts for the two preceding series of analyses no attempt was made to secure uniformity as to size and age. On the contrary they were picked out with a view of obtaining fairly representative samples of the largest and of the smallest, as well as of the most and of the least mature in each pile, so that they would vary through a wide range of color and weight. On comparing the two lots it will be found that the results agree very closely. Series XI, averages a little higher in the total yield of copra. but the oil content of this copra is somewhat lower than in series , Xso that they yield exactly the same quantity of oil per nut. The proportion of husk taken from the sea nut is much larger than it is from those gathered from the interior, but this is compensated for by the fact that the percentage of milk in the nut, free from husk, and of water in the fresh meat is considerably lower in the former than in the latter. Therefore it appears to be very evident that the superiority of trees growing near the sea is solely due to the quantity and not the quality of the nuts they produce.

ANALYSES OF A LARGE NUMBER OF NUTS.—As a check on these last results, secured on a small scale, Mr. Walker decided to determine the actual weight of the various products of the cocoanut under conditions ordinarily obtaining in the manufacture of the commercial copra, and with this end in view, 1,000 nuts were procured from trees growing near the seashore and the same number from those standing in the

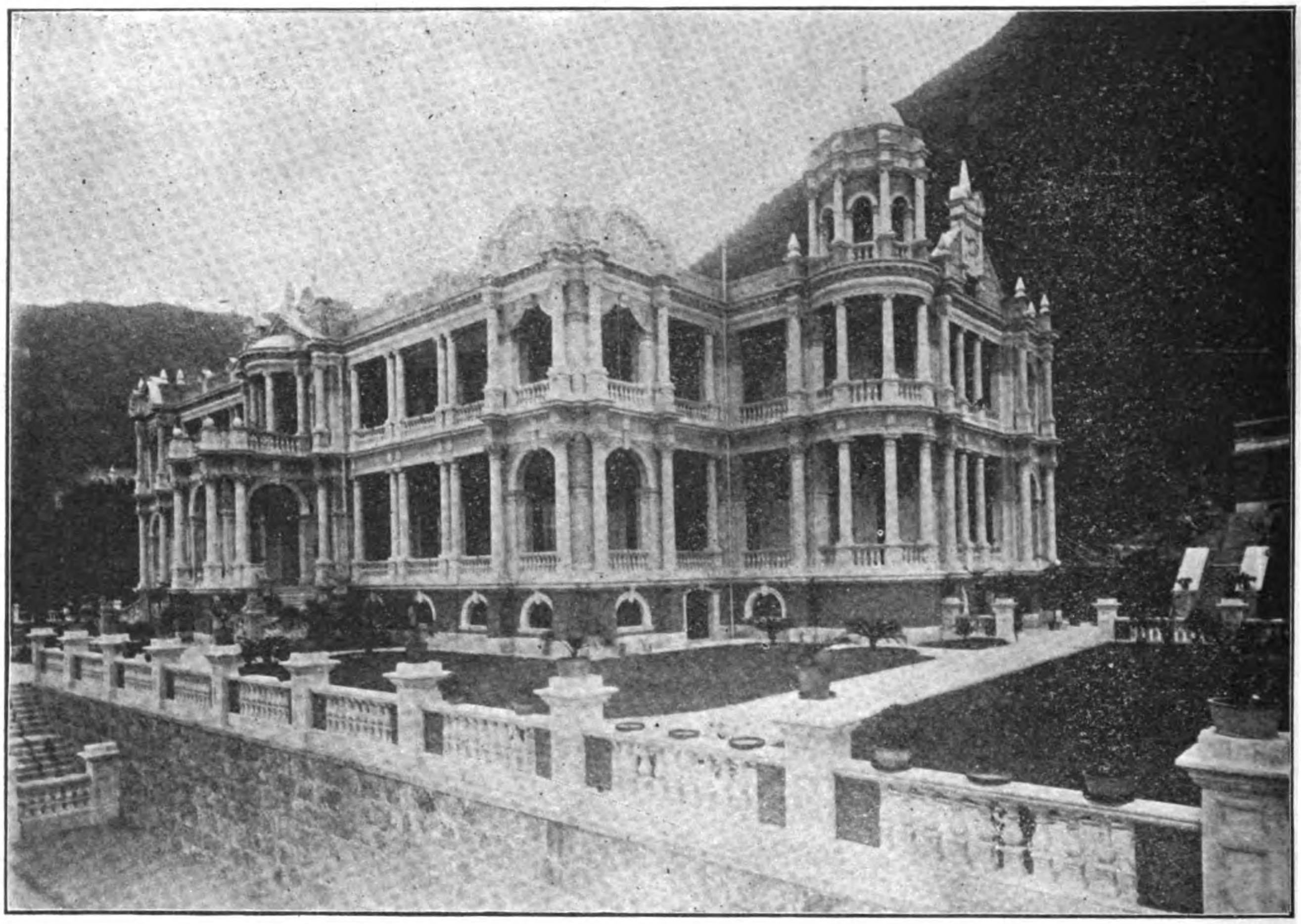
(Continued on page 228.)



KILN-DRYING; THE HALVES OF THE COCOANUTS ARE PLACED OVER THE GRILL FOR THE PRELIMINARY DRYING

PALATIAL RESIDENCE OF SIR PAUL C. CHATER IN THE HILL DISTRICT, HONGKONG

(Messrs. LEIGH & ORANGE, Architects and Builders.)

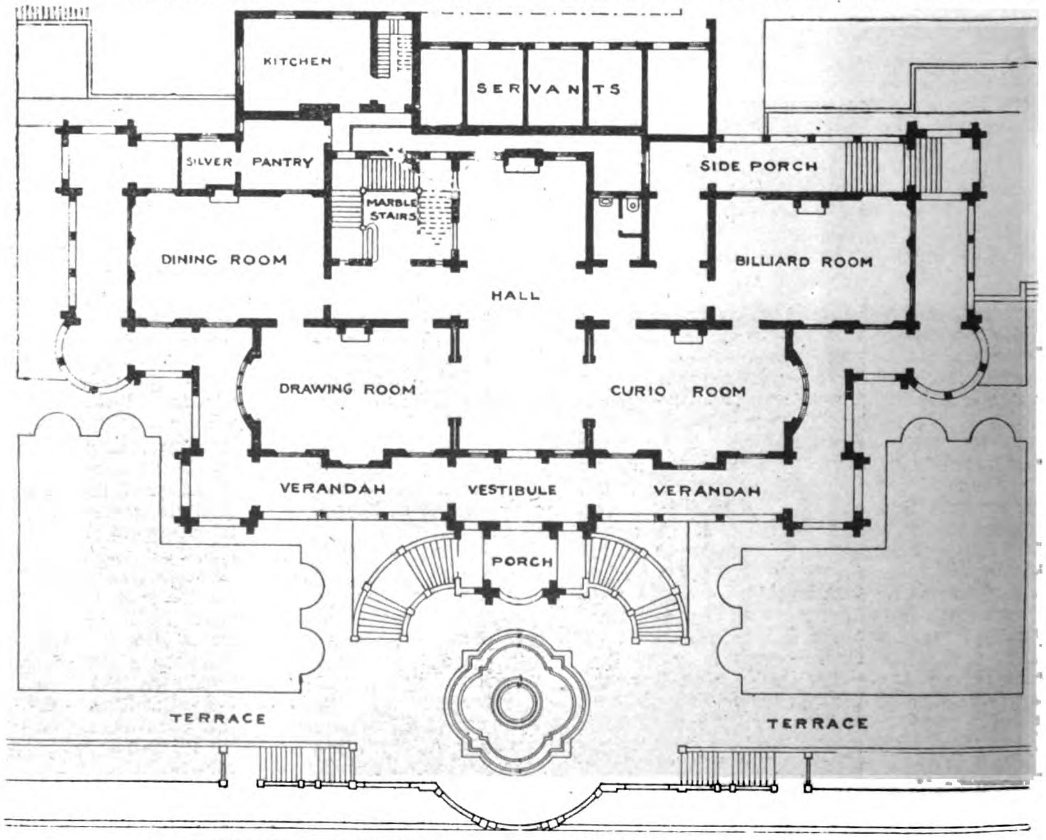


ELEVATION OF THE COMPLETED MANSION

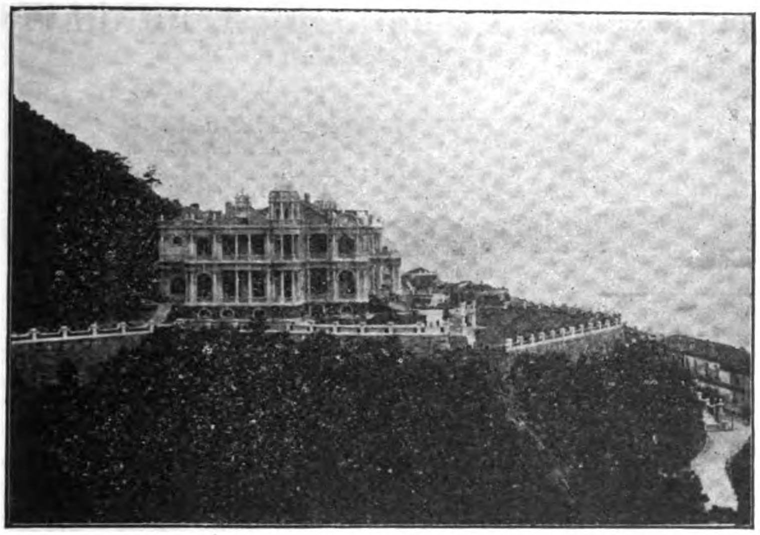
The recently-completed mansion of Sir Paul Chater, the *doyen* of Hongkong's merchant princes, is a triumph of architectural grandeur and elegance. The palace stands on a beautiful site of the Hill District of the colony, off Conduit-rd, and, according to the *Hongkong Telegraph*, from the center of the city to the battlement walls that encircle the structure a steep and ever steeper mountain path has to be negotiated, but at every turn new natural beauties unfold themselves while here and there the busy harbor, looking its best, peeps through the tangle of trees and rocky buttresses. A mountain rivulet carols down a gorge, below the pathway, and in bright days the ascent is bracing and wonderfully beautiful. In the depths lies Hongkong, while the mansion itself stands out clear-cut and cameo-like on the crest, backed by a rugged hill which rises still higher.

THE INITIAL DIFFICULTIES.—A considerable time has passed since Sir Paul Chater first decided to erect a mansion on the heights, but innumerable natural difficulties had to be overcome before even the first germs of his idea could be clothed in solid form. The site was obtained, but it was far from being then the plateau into which it has now been converted. It was a rocky eminence, abounding in physical excrescences, difficult of access. Near by was a sort of reservoir or tank which must first be removed, and altogether it was no easy engineering work which confronted the architects. But stimulated by the author of the scheme, Messrs. Leigh & Orange, who were appointed the architects, succeeded in surmounting the numerous obstacles before them, and the result of their work, or rather achievement, is seen to-day in what will rank for many years, if not for ages, as the finest mansion owned by a private citizen in Hongkong. Others may be led to emulate Sir Paul Chater in this matter, but theirs will be an uncommonly arduous task, which may not even at the finish realize their ambitions.

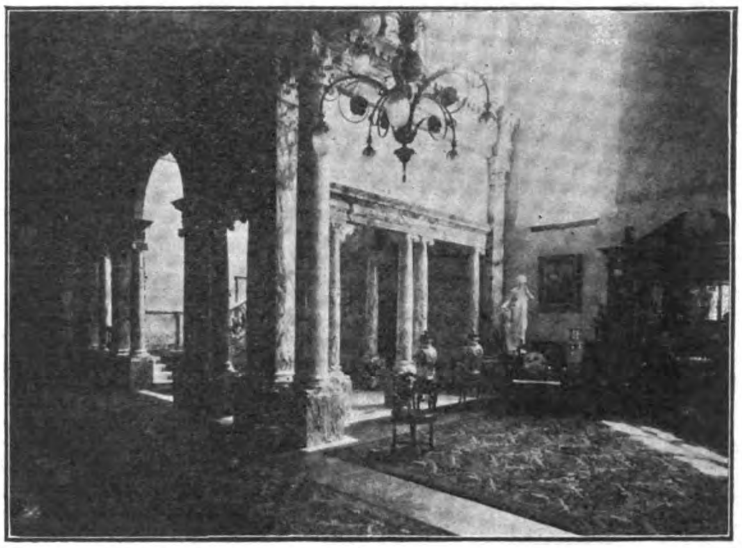
APPROACHING THE MANSION.—The mansion stands directly above the central business portion of Hongkong. In other words, it looks down upon the clock tower, whose dial can just be discerned through the trees, looking from the terrace of the residence. The building



GENERAL GROUND-FLOOR PLAN OF THE MANSION PROPER



ANOTHER VIEW OF THE RESIDENCE



MARBLE STAIRS, GROUND FLOOR; TAKEN FROM THE HALL

itself has been designed on classic lines, with a suggestion of the Renaissance in the stately colonnade which supports the verandahs. Approaching from the city, admission to the grounds is obtained through an ornamental gateway, heavy wrought-iron gates hung on moulded granite piers. The iron scroll-work of the gates was specially designed by the architects and finished in England. A charming lodge will be found at the entrance—and thence by a winding path to the main entrance.

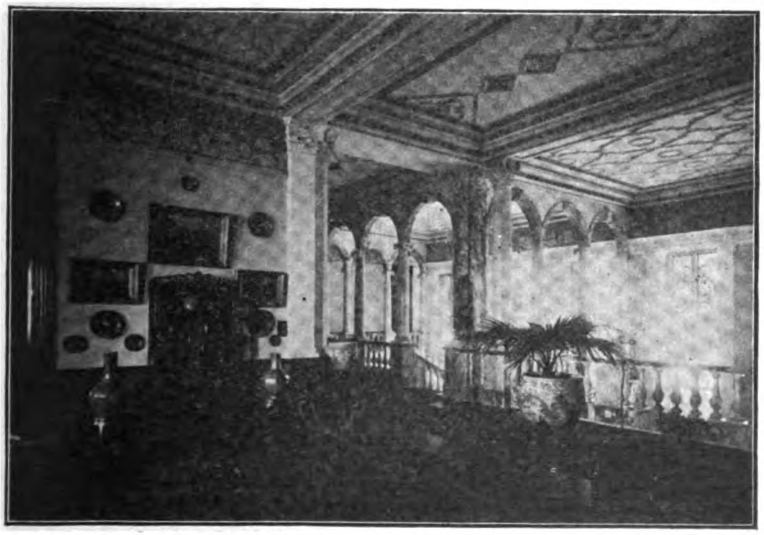
THE ENTRANCE.—Looking at the building as a whole, one is struck by its stately proportions, and finely-finished exterior. The porch, which is reached by curving steps at each side, stands out prominently from the structure. It is ornate, though by no means florid, in design, the archway being elaborately carved in stone. Corinthian columns stand on each side, and upon the pillars of the staircase rest Chinese lions, the work of Chinese sculptors at Foochow. From each side of the porch run long verandahs. Slender columns rise, those on the ground floor being Corinthian, while those above are Ionic. The main columns are Roman Doric design. At the entrance leading to the vestibule the floor is done in mosaic, imported from England, while the verandah floor is laid out in a plain design arranged with tiles. The main verandah is 125 ft. long and about 10 ft. wide. It circles right round the house.

THE MARBLE HALL.—Entering the hall from the vestibule, the visitor is immediately struck by the magnificence of the adornment. It may be that in the Orient there are equally fine houses, out the ordinary traveller seldom sees or hears qf them. From floor to ceiling, everything is marble. The lofty columns are of Skyros marble; the colonnade and the staircase are all marble, and even the supports of the staircase are of dark-grained marble of an exceeding rich appearance. All the marble came from Athens, and was imported from the Marmor Company, famous for its marble work in Europe. The staircase is in white marble, while the ornate ceiling and tessalated flooring complete a scene which, if one were not thought over-extravagant, might be termed gorgeous.

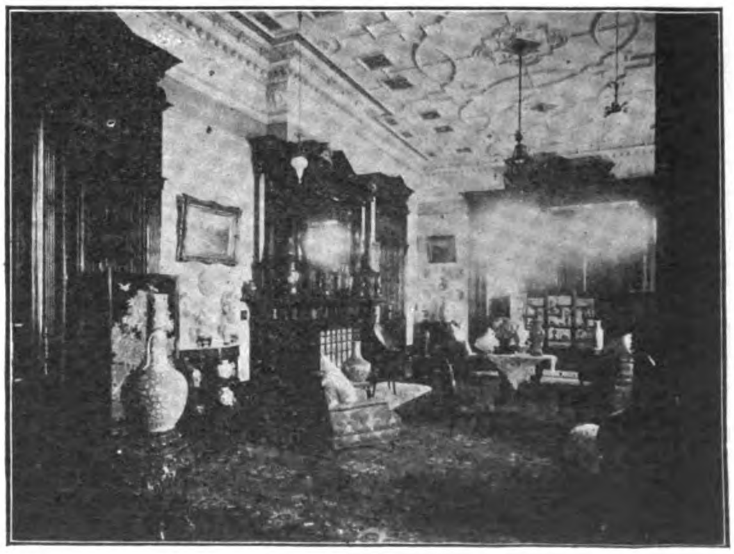
ELABORATE EMBELLISHMENTS.—The principal rooms—dining-room, drawing-room, billiard-room, and an apartment set apart for curios—are all on the first floor, radiating from the entrance hall. Each is furnished with folding-doors, elaborately carved in teak—no wood but teak is used throughout the building—and the great bow-windows are framed in stained-glass of chaste patterns. There are folding doors leading to the drawing-room, which is 37 ft. long by 24 ft. wide. All the woodwork presents an appearance of solidity in keeping with the general design of the interior. Beyond is the dining-room, similar in size to the drawing-room. The ceiling in each apartment is diversified with plaster work patterns, and whole teakwood openings afford ventilation. A freize goes round the top of the walls, and electric lights at each corner, and also suspended from the ceiling, convert night into day when the switch is turned. On the opposite side of the hall are the curio and billiard rooms. The freize under the cornice in the curio room is unusually tasteful in design, Madonna-like faces being circled by leaf patterns, and as the work was done by Chinese workmen on the spot it reflects the greatest credit on the ability of local tradesmen. The billiard-room is a well lighted chamber, quietly ornamented so far as the freize and character of the ceiling are concerned. As already stated, all the four principal rooms are of the same size, 37 ft. by 24 ft. and all are accessible to each other, besides affording easy entrance to the main corridor, the verandah, and the hall.

SIDE ENTRANCE AND OTHER CONVENIENCES.—At the rear of the dining-room there is a spacious tiled pantry, and a commodious kitchen, which is furnished with an up-to-date cooking apparatus, and a high pressure boiler for supplying hot water to every part of the house. The kitchen and adjacent rooms have the floors tiled, while the walls also up to the roof are of white, glazed sanitary tiles, so that everything should be spotlessly clean and free from the insistent microbe. There are the usual sculleries and such-like rooms, all built after the same pattern. A side-porch and private entrance leads, from the west side of the building, and it, also, has been carried out in the same lavish style as that distinguishing the main entrance. There are marble columns at each side of the corridor, and a scheme of ornate decoration along the walls. Indeed, the side entrance would, by most people, be considered a sight in itself, but it seems to pall after one has inspected the main hall and marble staircase.

PALATIAL BEDROOMS.—The upper floor, then, is given over almost entirely to four bedrooms. On arriving at the top of the marble staircase, one enters a large and lofty apartment which may be either a hall or a sort of drawing-room. It looks immediately over the portico and has a fine verandah whence one may overlook the harbor. The vista, indeed, extends to the borders of British territory on the N., E. and W. At each side are two bedrooms, vastly different from the ordinary style of bedroom. These are spacious and elaborately-finished apartments,



MARBLE STAIRS, FIRST FLOOR; TAKEN FROM THE LANDING



CURIO ROOM; TAKEN FROM THE HALL WITH SLIDING DOOR OPEN

decorated in the most palatial style. The fireplaces and mantels alone are worthy of attention. In one chamber the mantel, of pure white marble, is flanked by two cupids beautifully carved, while in the centre, above the fire, two raised doves appear. It is a representation of high art in sculpture and forms a feast for the eyes. In another bedroom the mantel, also of white marble, has at each side a magnificent specimen of the heron, whose long neck is curved, the bill resting on the breast. The careful modelling of the breast feathers, and the chiselling of the head and bill show that the work was not performed by any perfunctory artist but by one who took a pride in his productions. The other two mantels have not yet been placed in position, but, of course, they will be equally fine and worthy of inspection.

ADJUNCT APARTMENTS.—In conjunction with each bedroom there is a bathroom and lavatory. The bathroom is the embodiment of what such a chamber should be; it resembles nothing so much as one of those rooms in London's finest hotels. There is an enamelled bath, with hot and cold water circulation laid on, sprays, etc.; the electric light is provided there as in all the rooms, and the lavatory is replete with all the accessories essential to that virtue which is next to godliness. Each bedroom is adequately lighted by folding doors and windows, and each room leads directly upon a private verandah.

MAGNIFICENT VISTA.— It is from this story that the greatest view of the city, harbor, and surrounding district is obtainable. The vista is one of the charms of the place, for wherever the eye rests it lights upon a scene scarcely to be surpassed in changeful beauty and ever-beautiful change. As far as one can see lies the Lye-mun Pass; the serrated mountain peaks, with their grey and yellow ridges rising in serpentine folds from the valleys till they are lost on the summit of the mountains, are immediately in front; in the middle distance is the harbor with its ceaseless tide of bellying sails, unwieldy junks and skittish sampans, while the more dignified steamships gaze mastiff-like at the jerky *puffing billies* of launches, which hasten hither and thither like evil spirits; Kowloon, also, is stretched out in clear perspective; and at the W. side there is a long distant view of the ocean which most of us have crossed before we sought Hongkong's shores. It is needless to enlarge on this festive of the mansion, which is itself an example of the beautiful, but it is a factor in the life of those who will inhabit the mansion which none can overlook or forget.

PLEASANT FOR THE COOLIES.—Coming back to the prosaic, the servants, quarters are provided for at the rear of the main building. Out-houses, away from the mansion itself, have been built for the house coolies, chair-carriers, etc., and there the coolies find themselves installed in quarters which must lead them to believe that they have found an earthly paradise. There are rooms for stores, linen, washing and drying rooms, and such like. A circular staircase leads to the roof while a back staircase connects by means of a bridge with the main building.

ARTIFICIAL IRRIGATION IN CHINA

Mr. James Hutson, a British writer, gives an interesting account of the Kuan-Hsien river system, which narrates the conditions of life in the Chen-tu Plain of China. This vast plain of some 5,000 sq. ms. in area, is irrigated by the water system here explained, and is thereby one of the most fertile plains of China. It is said by the Chinese that the Chen-tu Plain originally was a vast marsh, through which the waters of the Min River flowed at will; and the casual observer might easily see that the present state of the works has been a gradual evolution, and doubtless many heads and hands have combined, many ways and means have been tried, and much treasure spent in order to regulate the wild and chaotic waters and introduce a system of artificial irrigation.

The waters of the Min River, flowing in a SE. direction, emerge from the mountains at Kuan Hsien a seething torrent. About 200 B. C. (as far as can be ascertained from the unreliable Chinese histories) a Chinese official, named Li-ping, entertained the idea of using these waters for irrigating and fertilizing purposes. To attain his object he cut away the end of the hill on which the W. wall of Kuan Hsien City now stands; making a cutting through the lower part of the W. arm of this hill, he thus formed an artificial gorge at the SW. corner of the city, through which he led a part of the Min River, which afterwards continued its course close by the S. wall of the city and then off in a NE. direction, the other half of the river continuing in its S. course to Kiang-k'eo and Sui Fu, where it joins the Yangtsze. The part of the river which flows through the gorge is colloquially and officially called the "inner river," the other half being called the "outer river." The waters of the "inner river," after passing through the gorge, are again subdivided into three main streams. All along the banks of these streams there are minor divisions, irrigation dams, or water-wheels which lead the water into smaller canals for domestic and agricultural uses in scores of towns and hamlets on the wast Chen-tu plain, thus transforming a once desolate region into a fruitful and well-watered garden.

About December 1st the yearly operation of repairing the river bed begins by cutting off the waters of the "outer river," sending all the water for the time being into the "inner river." This work is only possible in winter when the river is low, owing to the diminished rainfall and the frost on the Thibetan Uplands. When the waters are dry the digging operations begin. The large stones are carried to the river banks, the channel is scraped level, and the banks are made up with long bamboo baskets closely packed with cobble stones. When this is done the waters of the "outer river" are allowed to return to their original course; and then the "inner river" is dried up in a similar way. In the bed of the "inner river" between the foot of the hill and the overflow, two large iron bars are placed. These bars are said to have once been placed higher up in the river, but were carried down to this spot on the flood tide. At this point the waters of the river strike forcibly against the artificial banks of the overflow, and much silt is thrown back and deposited in mid-stream, covering these bars to the depth of several feet. When the river bed is cleared out, these bars serve as a guide to the contractors as to the depth they have to dig; they must be unearthed and left lying quite bare, or the officials will not pass the work. One bar bears an inscription dating from the Ming dynasty and the fourth year of the reign of the Emperor Wan-lih, about A. D. 1576. The other bar is of more modern times, dating from the present dynasty and the third year of the reign of the Emperor Tung-chi, about A. D. 1865. The bars are about 10 ft. long, and estimated by the Chinese to be about 3,000 lbs. each. The Chinese have unconsciously accomplished a great engineering feat, and this work has been going on for over 2,000 yrs.

The rule laid down by Li-ping for the management of the work is a wise and safe one, and doubtless is the secret of its success. It has been handed down from posterity, and is still deeply revered by the people. It is this: "Dig the channels deep and keep the banks low." This is the exact opposite of what China has done with the Yellow River.

For this work it is estimated that Tls. 1,500 are spent on rice to feed the coolies, Tls. 1,800 on bamboo, and Tls. 3,500 on labor, bringing the yearly expenditure up to Tls. 6,800, or about £850, but the yearly expenditure varies according to the damage done by the river. The districts getting full or partial advantage from the water are about 10, with a probable acreage of 25,000 *meo* (*meo* = ⅙ of acre). These lands have a water tax imposed which realizes about Tls. 1,000, or about ⅐ part of the whole expenditure. The remainder is paid from the land tax, and is obtained by the "inspector of waterworks" from the provincial treasurer through the intendent of circuit. The above does not show all the expenditure, but only that connected with the main divisions of the river. The minor divisions are either managed by private individuals or public subscription.

Generally about April 1st, or a little earlier, when repairs of the river are nearing completion, the inspector of waterworks selects a "lucky" day, and invites the intendent of circuit to come and inspect the work and open the river. This is an event of great importance to everybody, carried out with great ceremony. Large numbers of people line the banks to see the water come down, and its volume is often taken as a forecast of what the year's water supply will be like. By the time the "great man" has reached the city on his return journey the water has arrived, and if there is a good supply it reaches the capital before him. About May 1st the inner river is officially opened to raft traffic by the ceremony of sacrificing to the god of the river. It then remains open till January when it is closed for cleaning, but a few go to other places.

DEVELOPMENT OF CHEUNG-SHA

Since the taking over of the New Territory, Hongkong, by the British, according to Li Sum Ling, a progressive Chinese of that place, many improvements have been effected. Cheung Sha-Wan, many years ago, was studded with barren rocks on a sandy bank, with here and there groups of houses known as the Hakka villages, and for great distances no human beings were in sight. It is now blocked up with Chinese ship-building yards and a great number of steam launches and junks are being turned out every year. Along the coast one may see an improvement in the shape of the China and Japan Telephone and Electric Company's telephone wire leading to the W. to connect one of the offices of the Standard Oil Company. Not far away from the Chinese ship-building yards, there are heaps of old Chinese bricks belonging to the Fook Tin Tong, which owns large landed properties in Cheung-Sha-Wan.

Before the occupation of the place by the British, the late Li Sing, a Hongkong millionaire, purchased a vast piece of land there with a view to opening up the place. To attain his object, he bought a large quantity of building material which had broken down in the Taiping Shan Districts and after spending an immense fortune and much labor conveyed it over to Cheung-Sha-Wan. At one time, about 13 yrs. ago, a contractor went so far as to contract for the building of a row of houses on the shore of Cheung-Sha-Wan, but before completing construction, a typhoon came on and the half-built houses were reduced to the ground, to the great loss of the contractor. Since then no attempt had been made to restore the buildings. After a time the great millionaire died, followed by the passing of lands into the hands of the British, and the idea of developing the place was given up. The hundreds of thousands of bricks were sold, and what remains now represents the dead stocks which are unsaleable. The Fook Tin Tong, which belonged to the millionaire and others, still owns properties there, having a very dirty office in the charge of one or two of the company's employés situated not far away from Tsang King's workmen's quarters for the construction of the water-works there. Passing the South African laborers' quarters one notices the old broken-down offices which were formerly occupied by the Imperial Chinese Customs many many years ago. Further up the hill is a stone place which the natives say belonged to a Company which was formed for the purpose of brewing, but the company has now become defunct. The half-finished works, however, still remain. With a good water supply near at hand, one cannot help thinking that some day great industrial works will conmmence. Among the valleys are cornfields, fertile and rich. Cotton agriculture should be encouraged there. Judging from the rich corn crops, cotton cultivation would undoubtedly yield a rich harvest. Many natives are of the opinion that as soon as the Canton-Kowloon Railway is completed the market for fruits and vegetables will become greater as the Province of Kwangtung and the neighboring districts are the best fruit-producing places. A number of people have taken advantage of the fact that as soon as the Canton-Hankow Railway is constructed, a great demand for fruits for the northern countries will be assured, to plant a great number of sweet oranges, pumeloes, and other fruits.

SUCCESSFUL TEST OF POLILLO (PHILIPPINE ISLANDS) COAL, AND REPORTS OF EXPERTS ON SAME

(By Order of Governor-General Luke E. Wright.)

The Polillo Land Improvement Company, of Manila, P. I., has just received the certified results of an official test made by government experts at the Bureau of Insular Cold Storage and Ice Plant, in this city, of its coal. The fuel was brought to Manila from the company's mines on the Island of Polillo, Philippine Islands, in sufficient quantity to carry out a 24-hours' test at the insular ice plant, which was generously placed at the disposal of the company by Governor-General Wright, whose interest in the result has been keen from the beginning. The Governor-General went even further than this by having the test made under the direct supervision of three expert mechanical engineers in the government service, assisted by experts of the Bureau of Science, thus guarding the company against possible claims of interested outsiders that the test had not been impartially made. The vein of the Polillo mines has a 9-ft. face and is apparently inexhaustible.

The test from every view-point exceeded the hopes and expectations of the most sanguine shareholders in the company. As it was the first exhaustive test of any magnitude of the commercial value of Philippine coal, ever made in these Islands, its successful issue portends great activity in the coal mining industry of the archipelago. The test was made at the ice plant on December 21st, 1905, and following are the details of how it was conducted, together with the results obtained:—

Department of Finance and Justice, Manila, P. I.—*Bureau of Insular Cold Storage and Ice Plant, Office of the Director, January* 3d, 1906. Mr. Louis T. Grant, Trustee of the Polillo Land Improvement Company, Manila, P. I. Sir:—I am sending you under separate cover an exhaustive report prepared by the committee appointed to make a 24-hr. test of the coal mined by your company and delivered to this bureau in December, 1905.

Your company is to be congratulated upon the result of the test, which would indicate that your coal is at least equal to the Japanese and Australian coals to be obtained in the local market. With respect to ashes and smoke it was much superior to either of these, the percentage of ash being less than from any coal that has ever been burned in these furnaces. The total consumption for the 24 hrs. was 18 tons and 1949 lbs., the plant being operated at practically its full capacity.—Very respectfully, (Signed) J. F. Edmiston, *Director of Cold Storage.*

Report of the Coal Test.—*Manila, P. I., January* 3d, 1906. Mr. J. F. Edmiston, Director of Cold Storage, Manila, P. I. Sir:—I have the honor to submit the enclosed report of a coal test made at this plant on December 21st, for the purpose of determining the commercial efficiency of a native coal, mined on the Island of Polillo, by the Polillo Land Improvement Company, in accordance with instructions received from you to conduct the test and make a complete report thereon, trusting that the same will be satisfactory.—Very respectfully, (Signed) J. J. O'Donovan, *Chief Engineer, Bureau of Cold Storage.*

Manila, P. I., January 3d, 1906.—The Polillo Land Improvement Company, Manila, P. I. Gentlemen:—The committee appointed to conduct a test of the coal mined on the Island of Polillo, by your company, beg leave to submit the following report, which, for convenience of reference, is divided into three sections. *First*, the remarks and comments of the committee upon the details of the test, the condition and appearance of the coal, and the manner in which it was consumed. *Secondly*, the commercial test, this being of most important interest to the manufacturer or steam user, since the cost of producing steam is the real method by which the efficiency of any fuel may be judged. *Thirdly*, since the economy of a fuel is nearly synor nymous with the efficiency of a boiler, as a mattes of engineering simply, the commercial test ir supplemented by an engineering test, in orde that the economy and efficiency of the fuel, might be more fully determined.

In conclusion, we desire to express our high appreciation of the courtesies, and invaluable assistance extended to us by Mr. J. F. Edmiston, Director of the Bureau of Cold Storage, and Dr. Paul C. Freer, Director of the Bureau of Science.—Very respectfully, (Signed) J. J. O'Donovan, *Chief Engineer, Bureau of Cold Storage;* D. McChesney, *Master Mechanic, Depot Quartermaster's Department;* W. P. Williams, *Chief Engineer, Bureau of Science.*

Details of the Test.—The coal was received at the Bureau of Cold Storage, in sacks, 3 days before the test was made. It was in dry condition, and several samples were taken from the pile, thoroughly mixed together, and sent to the Bureau of Science for analysis.

All the instruments used during the test were carefully standardized, and type-written log sheets were placed at each station where data for the test was to be established, and every precaution was taken to guard against the possibility of errors being made.

The test was commenced at 8 a. m. December 21st, and ended at 8 a. m., December 22d, thus continuing throughout 24 hrs. The test was divided into three periods of 8 hrs. each, corresponding to the engine-room watches, which were from 8 a. m. to 4 p. m., from 4. p m. to midnight, and from midnight to 8 a. m. Before the commencement of the test the fire was thoroughly cleaned, and the small amount of live coal left upon the grate was carefully estimated. At the end of the test, the fire was again cleaned a short time before 8 a. m., December 22d, and the same amount of live coal left upon the grate as at the start.

Throughout the test all conditions were maintained as uniformly as possible, the same amount of work being done at all times. The water-level in the boiler was kept at the same height, and the feed water was practically the same temperature. A throttling steam calorimeter was used to determine the moisture in the steam, the flue gases were drawn off and tested by a chemist detailed for that purpose from the Bureau of Science, and the temperature of the flue gases was determined by a mercurial thermometer, inserted in a pipe through the center of the flue. The weight of the coal used and its proportion of combustible matter, were accurately determined. The exact weight of the water evaporated under the known conditions of the test was determined with the utmost exactness, as well as the percentage of moisture in the steam. Throughout the test the records were checked and verified by related observations.

Composition of the Coal.—The color of the coal is dark brown, and when broken the surfaces displayed show a layer of carbon which appears dull and lustreless; the fracture of the coal, when broken across, has a somewhat resinous appearance. It is a free-burning noncaking coal, and burns with a pale yellow flame It lights easily and burns well, the coal breaking apart under the action of the heat. It gives off a brown smoke which is not dense and makes little ash, the coal being almost entirely consumed. In this it resembles the better grades of Welsh coal. Much of the ash made was caused by the finer particles of the coal dropping through the grate. This ash was burned over gaina on the last two watches.

The fire burned without being cleaned, from 8 a. m. until 3:30 p. m., when it was broken up with a slicebar and 58 lbs. of clinker, or solid matter, taken from it. The remained ash was light and powdery in appearance. The fire was not again worked with either slicebar or rake until 10:30 p. m., when it was thoroughly cleaned, and 64 lbs. of clinker taken from it. The fire was again broken up at 3 a. m.. but not cleaned. It then burned well, and was cleaned before the end of the test at 8 a. m., at which time the quantity of solid matter removed from it was 68 lbs.

The percentage of carbon in the form of decrepitated coal which was in the ash, may be reduced by using a closer grate and a more skillful manipulation. This would be determined after the coal had been used in a plant for a short time. The carbon contained in the ash was, broadly speaking, about 60 per cent.

The practical efficiency of a given coal is dependent, not only on its chemical composition and theoretical heat value, but to a great degree upon its purity, and the admixture of earths, moisture or other foreign matters which it contains. The percentage of ash being small when compared with other coals, it follows that the thermal efficiency of the coal is proportionately increased, and from a commercial standpoint this small percentage of ash decreases the original cost of freight and handling, per heat unit derived, as well as the expense of removal of the same. These facts should command careful attention.

Dimensions of Boiler.—Kind of boiler, Babcock & Wilcox water-tube boiler; horsepower (builder's rating) 200; number of drums, 2; diameter of drums, 36 ins.; length of drums, 23 ft. by 3⅝ ins..; number of tubes, 108; outside diameter of tubes, 4. ins; length of tubes, 18 ft.; furnace (length and width), 6½ ft. by 7½ ft.; area of grate surface, 48.75 sq. ft.; area of heating surface, 2,000 sq. ft.; area of draft between tubes, 26.5 sq. ft.; ratio of grate surface to heating surface, 1 to 41; ratio of draft area to grate surface, .5435; ratio of area of grate to area of air space in grate, 2.15 to 1; area of damper opening at boiler, 8.55 sq. ft.; ratio of grate surface to area of damper opening, 5.7; area of chimney, 19.635 sq. ft.; height of chimney, 140 ft.; total area of air space in grate, 22.6 sq. ft.; total area of solid grate, 26.1 sq. ft.

Commercial Test in Detail.—*Manner of Start and Stop, and Kind of Run.*—The alternate method was used, in which the fire was cleaned and the amount of live coal left on the grate estimated. At the end of the test the fire was again cleaned, and the same amount of coal left on the grate. The run was continuous, and all conditions were maintained exactly the same. *Duration of Test*—24 hrs. *Total Coal Consumed.*—41,264 lbs. *Coal Consumed per Watch.*—From 8 a. m. to 4 p. m., 14,239 lbs.; from 4 p. m. to 12 a. m., 13,677 lbs.; from 12 a. m. to 8 a. m., 13,348 lbs. *Total Ash and Refuse.*—2,241 lbs. *Ash and Refuse per Watch.*—From 8 a. m. to 4 p. m., 764 lbs.; from 4. p. m. to 12 a. m. 853 lbs.; from 12 a. m. to 8 a. m., 624 lbs. (Note: The increase in ash in the middle watch was caused by cleaning the fire thoroughly. *Percentage of Ash*—5.43. *Percentage of Ash per Watch.*—From 8 a. m. to 4 p. m., 5.36; from 4 p. m. to 12 a. m., 6.23; from 12 a. m. to 8 a. m., 4.67. *Total Water Evaporated*—238,083⅓ lbs. *Water Evaporated per Watch*—From 8 a. m. to 4 p. m., 78,916⅔ lbs.; from 4 p. m. to 12 a. m., 79,250 lbs.; from 12 a. m. to 8 a. m., 79,916⅔ lbs. *Average Coal Burned per Hr.*—1,719⅓ lbs. *Average Coal Burned per hr. per Watch*—From 8 a. m. to 4 p. m., 1,779⅞ lbs.; from 4 p. m. to 12 a. m., 1,709⅝ lbs.; from 12 a. m. to 8 a. m., 1,668½ lbs *Average Coal Burned per sq. ft. of Grate per Hr.*—35.268 lbs. *Average Coal Burned per sq. ft. of Grate per hr. per Watch*—From 8 a. m. to 4 p. m., 36.51 lbs.; from 4 p. m. to 12 a. m., 35.069 lbs.; from 12 a. m. to 8 a. m., 34.225 lbs. *Average Quantity of Water Evaporated per hr.*—9,920.138 lbs. *Average Quantity of Water Evaporated per hr. per Watch*—From 8 a. m. to 4 p. m., 9,864.583 lbs.; from 4 p. m. to 12 a. m., 9,906.25 lbs.; from 12 a. m. to 8 a. m., 9,989.583 lbs. *Average Quantity of Water Evaporated. per hr. per sq. ft. of Heating Surface*—4.96 lbs. *Average Quantity of Water Evaporated per hr. per sq. ft. of Heating Surface per Watch.*—From 8 a. m. to 4 p. m., 4.9328 lbs.; from 4 p. m. to 12 a. m., 4.9531 lbs.; from 12 a. m. to 8 a. m., 4.9948 lbs. *Commercial h. p. Developed on Basis of 30 lbs. of Water Evaporated into Steam of 70 lbs. Gauge Pressure, from Feed Water of 100° F.*—323.331 h. p. *Commercial h. p. Developed at the Preceding Rating.*

per Watch.—From 8 a. m. to 4 p. m., 321.4209 h. p.; 4 p. m. to 12 a. m., 322.7456 h. p.; 12 a. m. to 8 a. m., 325.4939 h. p. *Average Boiler Pressure.*—155 lbs. *Average Temperature of Feed Water*—140.88 F. *Average Temperature of Feed Water per Watch*—From 8 a. m. to 4 p. m., 140.88° F.; from 4 p. m. to 12 a.m., 140.93° F.; from 12 a. m. to 8 a. m., 140.85° F. *Average Temperature of Escaping Gases*—513.66° *F. Average Temperature of Escaping Gases per Watch.*—From 8 a. m. to 4 p. m., 509° F.; from 4 p. m. to 12 a. m., 517° F.; from 12 a. m. to 8 a. m., 515° F. *Force of Draft Measured in ins. of Water.*—.85 in *Average Quantity of Water Evaporated per lb. of Coal, as Brought from Coal Pile.*—5.7697 lbs. *Average Quantity of Water Evaporated as Preceding, per Watch*—From 8 a. m. to 4 p. m., 5.5422 lbs.; from 4 p. m. to 12 a. m., 5.7943 lbs.; from 12 a. m. to 8 a. m., 5.9871 lbs.

Economic Evaporation.—*Moisture in Coal*—5 per cent. *Water Actually Evaporated per lb. of Dry Coal, from Actual Pressure and Temperature,*—6.0734 lbs. *Water Actually Evaporated per lb. of dry coal, as Preceding, per Watch*—From 8 a. m. to 4 p. m., 5.8339 lbs.; from 4 p. m. to 12 a. m., 6.0994 lbs.; from 12 a. m. to 8 a. m., 6.3023 lbs. *Equivalent Water Evaporated per lb. Dry Coal, from and at* 212°—6.8246 lbs. *Equivalent Evaporation as preceding, per Watch.*—From 8 a. m. to 4 p. m., 6.5555 lbs.; from 4 p. m. to 12 a. m., 6.8533 lbs.; from 12 a. m. to 8 a. m., 7.0819 lbs. *Equivalent Water Evaporated per lb. of Combustible, from and at* 212°—7.2377 lbs. *Equivalent Water Evaporated per lb. of Combustible, as Preceding, per Watch.*—From 8 a. m. to 4 p. m., 6.9476 lbs.; from 4 p. m. to 12 a. m., 7.3342 lbs.; from 12 a. m. to 8 a. m., 7.4480 lbs.

Commercial Evaporation.—*Equivalent Water Evaporated, per lb. of Dry Coal with* ⅛th *Refuse, at 70 lbs. Gauge Pressure, from Temperature, of* 100°—5.2470 lbs. *Equivalent Water Evaporated per lb. of dry Coal with* ⅛th *Refuse, as Preceding per Watch*—From 8 a. m. to 4 p. m., 5.0360 lbs.; from 4 p. m. to 12 a. m., 5.3165 lbs.; from 12 a. m. to 8 a. m., 5.3990 lbs.

Data and Results of the Evaporative Test.—*Manner of Start and Stop*—Running, with thin fire. *Kind of Run*—Continuous. *Duration*—24 hrs. *State of the Weather*—Fair. *Grate Surface*—48.75 sq. ft. *Heating Surface*—2,000 sq. ft. *Ratio of Heating Surface to Grate*—41. *Average Pressure*—Steam pressure by gauge 155 lbs.; atmospheric pressure, 29.80 ins.; draft in ins. of water, .85 in.; pressure per sq. ft. due to unbalanced column of air in chimney .4913 oz. *Average Temperature*—External air, 85.92° F.; fire room, 88.64° F.; steam, 368.62° F.; escaping gases, 513.66° F.; water entering heater, 89.56° F.; water entering boiler, 140.88° F. *Fuel*—Total quantity of coal fired, 41,264 lbs.; moisture in coal, 5 per cent; dry coal consumed, 39,200.8 lbs.; total ash and refuse (dry), 2,241 lbs.; total combustible consumed, 39,960 lbs.; per centage of ash, 5.43; dry coal consumed per hr., 1633.367 lbs.; combustible consumed per hr., 1,540 lbs.; dry coal consumed per sq. ft. of grate per hr., 33.5 lbs.; dry coal consumed per sq. ft. of heating surface per hr., .816 lb.; combustible consumed per sq. ft. of grate per hr., 31.589 lbs.; combustible consumed per sq. ft. of heating surface per hr., .770 lb.; average amount of coal fires each time, 100 lbs.; average time between firing, 4 min.; average number of shovelfuls fired each time, 6.5.

Bureau of Science Analysis.—*Proximate Analysis of Coal.*—Fixed carbon, 43.3 per cent; volatile matter, 48 per cent; moisture, 5 per cent; ash, 3.7 per cent. *Analysis of Ash*—Moisture, 2.4 per cent; combustible matter, 62.6 per cent; *Analysis of Clinker*—Moisture, 0.6 per cent; combustible matter, 12.2 per cent. *Heating Power of Coal*—Heat units per lb. of coal, B. T. U. 12,154. *Results of Calorimeteric Tests*—Average of thermometer, 268° F.; quality of steam (dry steam being taken as unity), .9757; percentage of moisture in steam, 2.43.

Water.—Total weight of water pumped into the boiler and apparently evaporated, 238,083 ⅓ lbs.; water actually evaporated (corrected for quality of steam), 232,297.9083 lbs.; equivalent water evaporated from and at 212° F., 267,534.2416 lbs.; equivalent water evaporated into dry steam, from and at 212° F., 261,033.1595 lbs.; factor of evaporation, 1.1237. *Water Used per Hr.*—Water evaporated per hr., 9,920.1380 lbs.; water evaporated per hr. (corrected for quality of steam), 9,679.0786 lbs.; equivalent evaporation per hr. from and at 212° F., 11,147.2591 lbs.; equivalent evaporation per hr. from and at 212° F. (corrected for quality of steam), 10,876.3806 lbs. *Economic Evaporation*—Water actually evaporated per lb. of dry coal (from actual pressure and temperature), 6.0734 lbs.; equivalent water evaporated per lb. of dry coal, from and at 212° F., 6.8246 lbs.; equivalent water evaporated per lb. of combustible, from and at 212° F., 7.2377 lbs. *Commercial Evaporation*—Equivalent water evaporated per lb. of dry coal, with ⅛th refuse at 70 lbs. gauge pressure, from feed water at 100° F., 5.2470 lbs. *Rate of Evaporation*—Water evaporated from and at 212° F. per sq. ft. of heating surface per hr., 5.5736 lbs.; water evaporated from and at 212° F. per sq. ft. of grate surface per hr., 228.66 lbs.; water evaporated from and at 212° F. per sq. ft. of least area of draft, 1,303.77 lbs. *Commercial H. P.*—Commercial h. p. developed on basis of 30 lbs. of water evaporated into steam of 70 lbs. gauge pressure from feed water of 100° F., 323.231 h. p.; h. p. (builder's rating) 200; per cent developed above builder's rating, 61.87.

CONSTRUCTION OF THE CANTON-SAM SHUI BRANCH OF THE CANTON-HANKOW RAILWAY

(Concluded from page 203)

Concrete for bridge foundations was composed of 1 part cement, 3 parts sand, and 5 parts broken stone. This cost in place from $10 to $14 per cub. yd., exclusive of cost of cofferdams when used, which added from $1 to $2 per cub. yd. The cement used was the "Green Island" brand which is one of the best cements in the Orient and very satisfactory to use on account of its uniformity. Sand of a most excellent quality was found in the immediate neighborhood while the broken stone came from the North River and cost about $2 per cub. yd.

Oregon Pine was used for forms, false work, etc., and cost in Canton $70 per 1000 ft.

Rolling Stock.—The rolling stock is all of American make. Eight second-hand locomotives of the Manhattan Elevated Railroad were bought for $3000 gold each, and sent out for temporary and construction purposes. The standard locomotives weigh about 80 tons complete and were built by the Pittsburg Locomotive Works. Two of them are in use now and they are very common-sense and up-to-date machines. Twenty 40-ton flatcars were sent out before the branch was completed and it was necessary to transform these into temporary passenger coaches. This was done by the user of rough Oregon Pine, boarding them up half way, putting on a roof covered with "P. & B." roofing, and furnished with four long benches running lengthwise of the coach. The first class coaches were the same except the benches were either covered with Canton matting or replaced with bamboo chairs and had Canton matting on the floors.

The next step was the conversion of boxcars into passenger coaches, which was performed by putting in benches and cutting two small windows on either side. After a few months first, second and third-class coaches were sent out, also baggage cars.

This branch commenced to pay after the first month that it was put in operation. The increase in volume of passenger traffic was steady for 15 mos., when very nearly the maximum was reached. Since then the increase has been slow. The receipts of this line average from $50,000 to $60,000 per mo., and the operating expenses are about 25 per cent. This makes a very creditable showing for Mr. Lind, the efficient traffic manager. An express freight has been established which is growing in popularity, and which is sure eventually to get all traffic in valuable cargo, such as specie, silks, tea, etc. It will be sometime, if ever, before this line will do a large freight business for waterways are everywhere and afford a cheap, if slow, means of transportation, and time is no object to the average Chinaman in his common everyday affairs.

The Main Line.—Construction was begun on the main line in January, 1904, and entirely suspended in October of the same year. During this time 12 ms. were practically completed from Canton to Ko Tong, with the exception of laying the rails over the last 6 ms. This work was not prosecuted vigorously as the money of the company began to get short and only a limited amount could be expended monthly. It was very unfortunate that these 12 ms. could not have been finished and put into operation, as they would have added very materially to the receipts of the company. On these 12 ms. there was one thorough cut which was about ⅓ of a m. in length and at the summit 50 ft. deep, and contained 112,000 cub. yds. of material. A small industrial railway was used to haul the material in this cut to make the embankments on either end. The extreme haul was 3000 ft. and the cost was 25c. a yd. The bridges on this section were all small and single spans. At Ko Tong 15 6-ft. spans were to be put in. The foundations had not been built at the time of the closing down of the work but the spans were made and in the yard of the Wong Sha, or Canton terminal.

Engineering Lessons.—A summarization of the lessons this railway construction teaches to foreign engineers, and others undertaking construction work in China, is embodied in one axiom,—treat the Chinese fair and be patient. There is no man living who will do as much work, do it as cheerfully and for as little money as a Chinaman if he is treated right and handled properly. He has disagreeable attributes to be sure, but his good qualities more than offset them. It must be understood that he is of necessity almost entirely ignorant of modern methods of doing things, but he is very imitative and learns easily. When the Canton-Samshui division was put in operation all the locomotive drivers were foreigners with Chinese firemen. Within 1 yr. from the date of opening all the foreigners had been replaced by the native firemen and only one foreign expert driver retained to have general supervision over the rolling stock and teach new men. The same thing was done in handling the steam pile drivers At first the crew was made up of foreigners who were soon replaced with Chinese. This applied through all the work, and when construction was suspended there was very little need of skilled foreign foremen, as Chinese skilled workmen had been developed in all lines.

JAPAN'S SHIPPING COMPETITION

The Tokyo correspondent of *The (London) Times* has this to say about the carrying trade of the Far East, with special reference to the rapidly-growing influence of Japan over maritime commerce in the Orient:—

The tendency of Japanese shipowners before the war with China was to confine their enterprise to domestic waters; but the expansion of national spirit caused by the war and the pressure of competition in coastwise seas owing to a plethora of carriers drove them further afield. It is thought that the latter movement may easily be carried still further. East Asia has become a chief arena of the world's diplomatic activity, and its commercial interest grows daily greater. Japan is the centre of that activity and that interest. Her foreign trade has swelled from 17,000,000 sterling in 1893 to 69,500,000 in 1904, and the tonnage employed in carrying it has increased in the same time from 9,000,000 to 27,000,000. The trade has quadrupled, the tonnage trebled. Turning to Chinese ports, we find that the entries and clearances aggregated at the corresponding dates 30,000,000 and 58,000,000 of tons respectively, a development of nearly double. Here, then, are two fields, that of her own oversea trade and that of the Chinese carrying trade, and Japan's share in them hitherto furnishes a measure of what may be expected for her hereafter. In Chinese ports, where the order in 1894 was England, Germany, Japan, the Japanese tonnage being only 1/5 of the British, Japan in 1904 had displaced Germany from the second place, and could show a tonnage equal to ¼ of the British. In Hongkong, too, Japan's shipping grew from 1/5 of the British figure in 1898 to ⅓ of it in 1903.

FAR EASTERN ENGINEERING, CONSTRUCTION, COMMERCIAL AND FINANCIAL NEWS

PERSONAL

MESSRS. FABER & VOIGT, of Kobe and Yokohama, announce that they have established themselves at Hamburg.

MR. J. O. P. BLAND, secretary of the Municipal Council of Shanghai, a well-known writer of Chinese affairs, has resigned his post to join the service of the British and Chinese Corporation.

MR INGLIS, of London, general manager of the Great Western Railway Company, was reported to have been appointed general manager of the new docks and harbor to be constructed at Singapore, but *The London and China Express* says the appointment has not been made.

ROBERT G. DIECK, C. E., has been appointed city engineer of the Municipality of Manila, P. I., at the annual salary of ₱7,000, Philippine currency, and formally assumed his new position January 1st. Mr. Dieck was promoted from the position of acting city engineer. Formerly he was superintendent of the waterworks system of the city and has been in the municipal service since 1901.

RAILWAYS, SUPPLIES, ETC.

ANTUNG-MUKDEN RAILWAY.—The Japanese railway between Antung, in Korea, and Mukden, in Manchuria, has been completed.

MAIL CONTRACT, STRAITS SETTLEMENTS.—The Railway Department will receive $9,708 this year from the government for the hauling of mails by train.

MALACCA-PULAU SEBANG RAILWAY, STRAITS SETTLEMENTS.—For completion of this railway, $100,000 appears in the present year's estimates.

EQUIPMENT, FEDERATED MALAY STATES.—During the current year the Railway Department of the Federated Malay States will purchase four locomotives and six carriages at an expenditure of $231,500.

CANTON-WHANGPOA RAILWAY.—The scheme for the railway between Canton and Whangpoa has been sanctioned by the Throne after being memorialized by the Board of Commercial Affairs.

KIANGSI-KUANGTUNG RAILWAY, CHINA.—The Board of Commerce at Peking has instructed the viceroy at Canton to submit a scheme for the construction of an inter-provincial railway system between Kiangsi and Kuangtung, and to find the necessary means for the purpose in view.

CANTON-AMOY RAILWAY, CHINA.—The first section of the Canton-Amoy line, which Chang Pat Chi, a millionaire from the Straits Settlements, is successfully promoting, is reported to start from the East Gate, Kwongchaufu, to Whampoa. The latter-named city will be the terminus of the line, and with a deep harbor at Whampoa it is intended to try and take commercial interests from Hongkong.

SWATOW-CHINCHOW LINE.—The Swatow-Chinchow Railway will probably be opened in the spring of 1906, as only a small portion of the line remains unfinished. When this line is completed it is quite likely that the constructors will direct their attention to the proposed Canton-Whampoa Railway, as their original intention was to connect this proposed line with the Swatow-Chinchow line.

DAGUPAN-CABANATUAN RAILWAY EXTENSION, LUZON, P. I.—An extension of the Manila Railway Company, Ltd., from Dagupan to Cabanatuan, Province of Nueva Ecija, is now open for public traffic. The new line brings a fine territory 70 ms. from Manila into direct communication with that city, and as the country which the line traverses is very rich, it may be expected that the company will before long be able to earn good returns from its investment.

PROPOSED KONGMUN-SUNGSUIHOW RAILWAY, CHINA.—It is reported that a proposal for a railway from Kongmun to Sungsuihow, a distance of about 20 ms., has been placed before Viceroy Shum by Chan Wai Hing. A capital of $1,000,000 has been agreed upon. It is the intention of the promoter of this line to connect it with the Sunning Railway. Sungsinghow is a business mart closely connected with Canton and Kongmun.

CANTON-HANKOW RAILWAY.—Since it was decided for the provinces of Kuangtung, Hunan, and Hupeh to construct, severally instead of conjointly, sections of the Canton-Hankow Railway, the gentries of the first two named provinces have been considering the ways and means of undertaking the work, but Hupeh has so far made no effort. Viceroy Chang Chih-t'ung has decided, however, to borrow from the treasury of the provincial salt intendent and from the reserve funds of his silk filatures and cotton yarn factories, which loans, to the total amount of Tls. 3,000,000, will be repaid when the railway is completed and begins to make money.

BORNEO RAILWAY.—The railway on the W. coast of Borneo seems to be stirring up the natives down that way. The Papar Bridge, having been carried away at the end of last October, has caused a great deal of delay and trouble with the transport across the river. Previous to the carrying away of the bridge trains were leaving Jesselton and Beaufort and arriving at their destinaton in 5 hrs. After the disaster, however, the delay at Papar was so great that the trains did not get in without being from 7 to 8 hrs. late. Now that the line has been opened again, great relief is experienced by the railway people.

IMPERIAL CHINESE RAILWAY ADMINISTRATION.—Sheng Kung-pao has wired to the Waiwupu and the Board of Commercial Affairs, Peking, that the Imperial Chinese Administration for the Peking-Hankow Railway having been established in Peking and Tang Shao-yih having been appointed director-general of the same, the Shanghai office of the Imperial Chinese Railway Administration should be abolished. The Waiwupu has memorialized the Throne to that effect, which has concurred in the recommendation. The Waiwupu has also secured the sanction of the Throne to have the railways between Tai Yuan and Chenting as well as Kaifeng-fu and Honan-fu administrated at the office of the Imperial Chinese Railway Administration.

KAWASAKI-KANAGAWA LINE, JAPAN.—The Kawasaki-Kanagawa section of the Keihin (Japan) Railway has been opened to traffic. The fare between Kanagawa and Shinagawa is 18 sen for single journey and 25 sen for return trip. The through fare for the Yokohama, Keihin, and Tokyo electric car lines will be 25 sen single journey. The government railway, now threatened with competition by the Keihin Electric Railway, will try to score by reducing the time of the journey between Yokohama and Tokyo. The electric tram will run between Kanagawa and Shinagawa— it is said— in 29 min. 30 sec. The government railway trains will endeavor to cover the distance between Yokohama and Shimbashi in 27 min. A trial run on that basis has been successfully carried out.

CANTON-AMOY RAILWAY.—The promoters of this line have submitted to the Board of Commerce, Peking, a scheme for its construction, and a prospectus embodying it is expected to be issued shortly. The Canton-Amoy Railway Company, Ltd., with a capital of Tls. 800,000 (8000 shares of Tls. 100, with a guarantee of an annual dividend of 6 per cent) has been floated for the purpose of constructing the line. The route starts from Tai Tung Mun, (E. of Canton), enters Whampoa, crosses Tsangshing, Tungkun, Shakloong, Waichow, Poklo, Hoilukfung, Chiuchow, then runs into Foekin and ends in Amoy. The company will enjoy supreme control for 60 yrs. and has been promised that no other railways will be allowed within 10 ms. on either sides of the Canton-Amoy Railway. In event of hostilities, the government shall have complete control of the line for the transportation of troops and other purposes. Provisions have also been made respecting telegraph along the line and railway guards as well as the management of the line.

RAILROADS IN CHINA.—Viceconsul Cloud, of Hangchow, writes to Washington that the Chinese have projected many lines of railway, concerning which there is much strong talk at the present moment. Among the more important of these are:—The Hankau-Canton line, recently bought back from the American-Belgian syndicate; the Peking-Kalgan line, on which work began last autumn; the Shanghai-Soochow-Hangchow-Ningpo line, formerly granted to a British syndicate, but whose concession has been canceled; the Tientsin-Chinkiang line, running almost straight S. from Tientsin to Chinkiang on the Yangtsze River; a line from Swatow to Amoy and Fuchau, along the coast; a line from Ich'ang, above Hankau, to Chungking in Szechuan, and a line from Chungking S. to connect with the French system in Yunnan. Besides these many shorter lines have been surveyed, and of which there is some promise.

NEW SHANSI RAILWAY, CHINA.—For some months past strenuous efforts have been made by the merchants and gentry of Shansi to float their railway scheme, and the Shansi governor recently submitted a memorial reporting the establishment of the Tung-pu Railway Company by the Shansi gentry and merchants for the protection of China's interests. The proposed line is from Taiyuan, the provincial capital, to Puchou in the S. and to Tatung in the N. covering an area of some 2,000 li, and the estimated cost some Tls. 20,000,000. The promoters are raising a sum of about Tls. 500,000 for the construction of the section between Taiyuan and P'ingyao at the outset. The management will be in accordance with the rules of the Board of Commerce, and Hankow-Canton and Hankow-Szechuan lines. The Board of Commerce after due consideration of the scheme has warmly commended the exertions of the local men, as Shansi is undoubtedly a rich province and it is too often the custom of wealthy Chinese to neglect their own provinces and spend the money elsewhere. The board questions whether the necessary funds are all in hand, or the requirements of the railway regulations all fulfilled, and calls the attention of those who have means to the special advantages offered by regulations 9 and 12 to those who raise money for public enterprises, in order to stimulate public spirit.

PEKING SYNDICATE'S CONCESSION, CHINA.—The Peking correspondent of *The Times* (London), announces the signature of the agreement, by which the Peking Syndicate sells its railway from Tao-kou to Ching-hua to the Chinese Government payment to be made in 5 per cent bonds to the amount of £700,000 guaranteed by the Chinese Government, and the syndicate to work the line on account of the government. The delay has been due to the obstruction of Sheng, Director of Railways. In this case his unwillingness to sign was due to the fact that China, by the terms of the agreement, which must give the British similar rights to those granted to the Russians in the case of the Cheng-ting-Tai-yuen Railway, is required to guarantee as from January 1st, 1905, interest upon the capital of the railway, which amounts to £35,000. The railway is 91 m. in length, and runs from the mining property of the syndicate in Honan Plain to the small Wei River, crossing half-way the Peking-Hankow trunk line. The railway at present is, naturally, unable to earn its running expenses, but expects a large increase in its income when the two shafts now being sunk by the syndicate reach coal. These shafts are down 400 ft. The work was begun in September, 1902, and has been much delayed by the unexpected abundance of water. Coal was reached before the end of 1905, and the mine opened out. The syndicate is confident that coal will be found of ample thickness, but owing to the breaking of the boring-rod before reaching coal there is no absolute certainty as regards the depth at which coal will be struck or as to what is the thickness of the seam. Owing to the new coal mines already opened or projected, including the Lin-Cheng-hsien coalfield owned by the Peking-Hankow Railway to supply the country along the line N. of Honan, the main expectation of the syndicate is to sell its coal— which, judging from the coal obtained from native mines in the vicinity, is believed to be of excellent quality and semi-anthracite—in the Yangtsze. To reach this district the coal must be carried 385 m. over the Franco-Belgian trunk line controlled by Director Sheng. This latter railway crosses the Yallow River by a bridge, the largest in China, and the object of much interest to engineers, who predict that a considerable portion of it will disappear in the first flood; whereas, if it stands, the knowledge derived from all previous experience of the scouring powers of the Chinese rivers, especially the Yellow River, must undergo revision. No doubt the Peking Syndicate will obtain a clearly defined written agreement with the Belgians and Sheng guaranteeing the economical and uninterrupted carriage of its coal to the Yangtsze or along the railway to the N. failing which it should carry out its original intention to construct a railway 33 ms. long into Shansi Province, where its most valuable concessions are situated, and build a permanent bridge of its own across the Yellow River and a trunk line of its own from the bridge via Kai-fong to Nanking. Already the syndicate has prior rights to construct this railway, which would be one of the most promising in China.

ELECTRIC LIGHTING, TRACTION POWER, ETC.

TELEPHONE EXTENSION, JAPAN.—A telephone service has been inaugurated at Atsuta Village, Atsuta-gun, Hokkaido.

ELECTRIC TRAMWAY, PENANG, STRAITS SETTLEMENTS.—The new electric tramway at Penang is drawing near completion. The cars are singledecked, and seats run in rows across the breadth of the cars. They are entered from the side.

TELEFUNKEN APPARATUS.—The Argentine Navy has Telefunken apparatus in use on four warships, namely, *Julio*, *Patria*, *Libertad* and *Independencia*. Messrs. Arnhold, Karberg & Co. are China agents for System Telefunken.

ELECTRIC LIGHTS FOR WUCHANG, CHINA.—Part of a loan of Tls. 1,000,000 which has been secured by the Viceroy at Wuchang from a British firm, for public improvements there, will be expended for the installment of an electric lighting system in the viceregal city.

KUALA LUMPUR, SELANGOR, FEDERATED MALAY STATES.—Eighty thousand dollars has been set aside for the electric light scheme in this city, making up the balance of the $880,000 originally estimated, while $35,000 is allotted to lighting government quarters.

ELECTRICITY FOR CANTON, CHINA.—Albert C. Lee, of Providence, R. I., an electrical engineer, and Y. C. Lee, of New York, a civil engineer, cousins and both natives of China, have arrived at Cantŏn from the United States in compliance with a summons from the viceroy there, to make the preliminary estimates for the installation of a big municipal power and lighting plant, with the probability that a big system of electric railway, under municipal control will follow. The expenditure of millions of dollars to give Canton a modern lighting and power plant will follow the reports of these two authorities, both of whom have been educated in America.

ELECTRICITY IN CHEFOO, CHINA.—The promoters of the Chinese Electric Light Company, Ltd., in Peking, have obtained sanction from the Board of Commerce and the Governor of Shantung for the introduction of electric light into Chinan for the use of both foreigners and Chinese. Tls. 150,000 is to be invested at Chinan by Chinese merchants of Tientsin, Chefoo and Chinan. The company promises to charge in silver currency $1 per lamp of 10 candle-power, $1.60 per lamp of 16 candles and $2.50 per lamp of 25 candles, per mo. It will be managed after the new regulations of the Board of Commerce concerning the establishment of electric light companies in China.

ELECTRIC POWER IN INDIA.—Plans are now being perfected for the generation of electric power on a large scale in the Punjab for transmission to Lahore and Amritsar, the Punjab Power Association of London having been formed for the purpose. The power is to be generated on the Bari Canal and transmitted over a distance of 70 ms. to the first mentioned city and 100 ms. to that named second. Coal at the points of delivery of the power now costs from $5 to $6 per ton, and it is expected that the low price at which electric power will be supplied will give a general interest to industrial undertakings at Lahore and Armitsar. The United Provinces Power Association of London has also been formed to develop hydraulic power on the Jumna River and to transmit electric power to Delhi, 140 ms. distant, and possibly to Simla, 95 ms. distant in the opposite direction.

ELECTRICAL ORDERS, JAPAN.—The General Electric Company of the United States has recently received orders from Japan for electrical machinery, as follows: Fusan Electric Company, two 45-kw, belt-driven direct

current generators Ashio Copper Mine, one 50-kw, 500-volt, 50-cycle induction motor; one three-phase 60-kw transformer and two switchboard panels. Nagoya Electric Light Company, 21 two-phase induction motors aggregating 210 horse-power; 40 60-cycle transformers aggregating 215 kw. Tokio Shigai Railway, two 25-hp induction motors. Arakawa Mines, two 65-hp induction motors geared to two Deane single-acting 8½ in. x 12 in. pumps, rated to deliver 650 U. S. gallons of water per minute, against 1,010 feet head. Mitsui & Company, Tokio, three 50-kw, three-phase, 3,500-volt., Curtis turbine generators; two 25-kw, 450-volt, direct-current tandem-compound marine generating sets; one 125-kw induction motor and 28 other induction motors aggregating 670 horse-power; six 30-kw transformers; nine three-phase transformers aggregating 225 kw., and a switchboard consisting of nine transformer panels.

WATERWORKS AND IRRIGATION

WATERWORKS INSTALLATION, WUCHANG, CHINA.—This viceregal city of China is to have a modern waterworks system. Money has been loaned to the viceroy by a British firm to carry out the improvement.

CANTON (CHINA) WATER SUPPLY.—A party of foreign engineers is now at work making a complete survey of the Chinese city of Canton preliminary to the construction of a waterworks system under the diretion of the viceroy. The general work of triangulation has been finished and the streets are now being filled in, elevations being taken at frequent intervals. While this work is progressing all possible sources of water supply are being investigated. A pumping station (or stations) at the source (or sources) of supply, with towers in several sections of the city, probably will be the scheme submitted. This is the first proper survey ever made of Canton and one incidental result of it will be that an accurate map of the city will be available.

BUILDINGS

RESIDENTIAL SCHOOL, KUALA KANGSAR, PAHANG, FEDERATED MALAY STATES.—For land and buildings for the Malay Residential School at Kuala Kangsar, the government has appropriated $30,000.

RESIDENT-GENERAL'S HOUSE, PAHANG, F. M. S.—For completion of the resident-general's house at Kuala Kangsar, $45,000 will be spent during the current year. For furniture, electric bells and wiring, an additional sum of $16,509 will be expended.

BRIDGES

BRIDGING CANTON RIVER.—Since the Canton River (China) reclamation has been extended, the river has become narrower and the consequence is that during high tides many ferryboats are upset and lives lost. With a view to securing public safety, a scheme has been submitted to the viceroy by merchants for the construction of a bridge across the river. To save expense it is proposed to construct a wire bridge from the Hoi Chu Fort, and it has been estimated that a sum of Tls. 500,000 will be required to carry out the work.

PUBLIC WORKS

PUBLIC WORKS, FEDERATED MALAY STATES.—The various works projected for the current year by the Public Works Department of the Federated Malay States will cost in the neighborhood of $2,291,557.

KUALA LUMPUR, SELANGOR, FEDERATED MALAY STATES.—Possible improvements in the capital city of Selangor, Federated Malay States, include votes for the draining and filling in of swamps, the survey of the drainage system, the reconstruction of drains, the purchase of land and construction of back lanes, special reconstruction of roads and streets, and $21,000 for new roads. A new steam roller is also allowed for. Other public works:—"*Waterworks, Kuala Lumpur*"—Private supply, $1,000; extension of branch mains, $25,000; dipper fountains for standpipes, $4,400; extension of intake filters and improvements to pipe line, $7,000; surveys for further extension of service of water supply, $8,000. The Town of Klang gets $18,000 for the extension of its water supply, and provision is made for preliminary surveys to supply Kuala Kubu with water.

PORT WORKS, DREDGING, DOCKS, ETC.

NEW IRON PIER, PENANG.—Sir John Anderson, Governor of the Straits Settlements, has, it is reported, decided to name the new iron pier at Penang "Swettenham Pier."

KIANGNAN DOCK, SHANGHAI.—The new Kiangnan Dock, belonging to the Chinese Government at Shanghai, is now open. The Chinese cruiser *Kiangnan*, Admiral Sah's flagship, was the first vessel to be docked.

KIANGNAN DOCK, SHANGHAI.—Among the many improvements under way in Shanghai none exceed in importance, to shipping interests, those recently consummated at Kiangnan Dock. The dock has a river frontage of ¾ m. New, modern and costly machinery has been erected for the repairing and construction of sea craft. The dry dock has a length on top of 395 ft., length on blocks of 375 ft., width of entrance 60 ft., water on sill, spring tides, 19 ft. Two 20-in. pumps and one 10-in. pump have been installed. These pumps have a capacity of pumping the dock dry in 90 mins. There are patent slips for hauling up small craft. In the new machine shop a 40-ton overhead traveling crane has been installed. The heavy machinery in this shop is second to none in Shanghai. The shop large as it is, is fully occupied by the rapidly increasing business of the company, which is now building a steel towboat for a local firm. Three steam launches, for harbor use by the company, have been ordered and are now on their way. Mr. R. B. Mauchan, well-known in Shanghai, is the efficient superintendent of the dock.

TOW OF THE DRYDOCK *Dewey*.—The Navy Department at Washington has decided to use the supply ship *Glacier* and the colliers *Brutus* and *Cæsar* to tow the big drydock *Dewey*, recently completed by the Maryland Steel Company at Sparrow's Point, Maryland, to Manila, and has ordered from the American Ship Windlass Company, Providence, R. I., three No. 5 Shaw & Spiegle towing machines, the same make that was used in the transoceanic towing feats of the Standard Oil Company lately, and which proved so eminently successful. There are now about 150 of these machines in use, and there has never been a case where one has failed to do its duty, and they are the only machines that have ever been thoroughly tested in ocean towing. The action of this machine in avoiding heavy strains on the hawser is simply perfect. Its distinctive feature is that by means of its driving and cushioning steam cylinders there is provided an elastic steam cushion and an automatic relief to the hawser, without which the hawser would be continually straining and frequently breaking. In fact, it is the only known method of towing by which to prevent heavy strains on the hawser. It was expected that *Dewey* would get under way about December 1, and that it would take about 5 mos. for it to reach its destination in the Philippines. The route will be by way of the Suez Canal, a distance of 10,500 miles. There is no question of the wisdom of the Navy Department in deciding on this method of transporting *Dewey*, and it is evidence that it realizes fully the importance of throwing every safeguard around the moving of this gigantic structure on its long voyage, and thus insuring it against going adrift from the vessel towing it in case of storm or heavy seas liable to be encountered on the ocean. That it has chosen the best appliance made for the purpose will be conceded by all who have seen the Shaw & Spiegle machine in action and know what it is capable of doing. This method of towing is now employed by shipping all over the world, and the American Ship Windlass Company, the builders of the Shaw & Spiegle machines, have hundreds of letters testifying to its reliability and perfect service.

SHIPBUILDING, MARINE, ETC.

JAPANESE FLAGSHIP *Mikasa*.—Salvage operations are progressing satisfactorily on the Japanese flagship *Mikasa*. The authorities are determined to raise her with the least possible delay.

NEW CHINA MERCHANTS' STEAMER.—The latest addition to the already fine fleet of the China Merchants' Company arrived in Hongkong recently. She is Hsinchang, a fine up-to-date passenger and cargo steamer.

TOYO KISEN KAISHA.—This Japanese shipping company has inaugurated its service to South America with the chartered steamer Glenfarg, which sailed from Kobe and Yokohama recently on the first trip in the company's new service.

MEASUREMENTS OF JAPANESE CRUISER *Tsukuba*.—The new cruiser *Tsukuba*, which was recently launched by the crown prince of Japan, at Kure, is a vessel of 13,750 tons displacement, 440 ft. long, 75 ft. wide, with a draught of 36 ft. She is the largest warship ever built in Japan, and was set on the stocks January 14th, 1905.

NORTH GERMAN LLOYD.—A new steamer for the North German Lloyd, named Hessen, and to be employed in the service from Bremen *via* Amsterdam to Java, has made its initial voyage to Java and Australia. It is of the same type as the ss. Franken. The dimension is 124.9 meters length, and the displacement 5,000 gross registered tons, while the engines develop 3,842 h. p., and give a speed of 14¾ ms., with 84 r. p. m.

CHINESE CRUISER RAISED AND DOCKED.—The Chinese cruiser *Lui Fu*, which was sunk by collision with the Canton River boat *Tai On*, has been raised and docked. As *Tai On* is owned by a Chinese company registered at Hongkong the Chinese Government has lodged a claim for indemnity at the British Consulate, Canton. The foreign surveyors estimate the damage to the cruiser at $4,000, but the Chinese claim $8,000, so the case is still unsettled.

RIVER NAVIGATION, CHINA.—Some prominent Chinese merchants of Liachoufu have obtained permission of the Governor of Shantung to form an inland navigation company for shallow draught steamers and launches over inland rivers. The company's capital is Tls. 150,000 which will be entirely subscribed among wealthy Chinese officials and merchants. The Bureau of Commercial Affairs at Chinan has been instructed by the governor to protect the company and try every means in its power to assist the promoters, so as to make the concern a profitable enterprise.

MOTOR LAUNCH, BORNEO.—Another addition to the Sandakan River fleet is the motor launch recently imported by the Borneo Company, Ltd., for the Kuching River trade, and more especially, for the pepper trade. The new launch, which has been named *Astana*, is a 2-decked twin-screw vessel, flat bottomed, and when fully loaded drawing only 2 ft. of water. She is 70 ft. long and 15 ft. broad, and will carry about 200 passengers or 20 tons of cargo. She was specially built to order by Saunders Patent Launch Building Syndicate, Ltd., Goring-on-Thames.

ANOTHER TRANSPACIFIC LINE.—The *Railway and Engineering Review* says that Senator Clark has completed plans for the establishment of a line of steamers to be run from San Pedro to the Orient in connection with the San Pedro, Los Angeles and Salt Lake Railroad. These boats are to touch at the Hawaiian Islands and the ports of China, Japan, and Manila, and are designed to compete with the steamers of the Hill lines, and to supplement the Harriman lines. The United States Government has finished at San Pedro a break-water costing $5,000,000 which makes it a fine harbor, as vessels drawing 35 ft. can enter. The San Pedro line has begun the construction of large docks at its terminal, and the company is chartering tramp steamers to encourage the trade and prepare for the establishment of the new line when the new boats already contracted for are finished. The contracts call for the building of four new 15,000 ton steamers

NEW INDO-CHINA STEAMER.—Messrs. William Dobson & Co. launched at Walker-on-Tyne a steel screw steamer built to the order of the Indo-China Steam Navigation Company, Ltd., for its China coast service. The vessel is of the spar-deck type, with bridge and forecastle, of the following dimensions:—Length between perpendiculars, 265 ft.; breadth, 40 ft.; depth, moulded, 23 ft. She is designed to carry a dead weight of about 2,600 tons on a light draught and steam at a good speed. The propelling machinery, which is being constructed by the North-Eastern Marine Engineering Company, Ltd., of Wallsend, consists of a set of triple-expansion engines, having cylinders 20.33, and 54 in. in diameter, and 39-in. stroke. Steam is supplied by one large single-ended boiler, fitted with forced draught. The vessel was named *Cheong Sing* ("Prosperous Promotion").

BOSTON SS. COMPANY'S NEW PACIFIC LINERS.—The Boston Steamship Company, which operates the steamers Shawmut and Tremont, will, it is reported, augment its Transpacific line by the addition of two other steamers of about 10,000 tons gross. According to the annual report of the company Shawmut has been a loser in the past year. The Company made a net profit in 1904 of $21,000 against $125,502 for 1903. President Winsor said in his annual report:—"The chief cause of the small profits is that the steamer Shawmut, during a typhoon at Hongkong, was driven ashore in August, 1904. While we collected from the underwriters the cost of repairs we were not able to cover by insurance the loss of service, which in this case was about 3 mos. If we had the carrying capacity of this ship during the time lost by this disaster the net result of the year's business would have been about $50,000 better. We have expended and charged to operating expenses $81,334 for repairs on the ships. They are to-day in excellent condition and well kept up. The cost of the passenger accommodations has proved a wise one and has paid a good return. Your steamers are covered by insurance to the extent of $1,810,000. Owing to the end of the war between Japan and Russia we have been obliged to carry the past year, which amounted to about $6,500. Another year's operations confirm the opinion previously expressed, that the American merchant marine in foreign trade requires some reasonable encouragement from the government."

MINES AND MINING

GOLD IN JAPAN.—Upon the borders of Hitachi, Iwaki and Shimotsuke, Japan, there is a mountain called Hakko-zan, and it is believed gold may be found there in considerable quantity.

PEKING SYNDICATE.—The seam of coal on which efforts of the Peking Syndicate have been concentrated for some time has been successfully reached, and the syndicate hopes within the next few weeks to bring to the surface coal of a very superior quality, and probably at a lower rate than is now in vogue.

KEROSENE OIL FIELDS, CHINA.—United States Vice-consul Gracey, of Nanking, reports that abundance of kerosene oil has been found in the region of Yenanfu, Province of Shensi, China, covering an area of 100 to 130 ms The quality is reported to be equal to that found in America, and the natives are now using it for lighting purposes. Owing to the lack of refinement this gives off considerable smoke, which could be easily overcome should a refinery be started there. It is hoped by the Chinese gentry that a company may be formed to provide funds for an oil factory.

CHIHLI (CHINA) COAL-MINING ENTERPRISE.—M. Jadot, chief engineer of the Ching Han Railway, is making a loan of Tls. 930,000 to the Tientsin customs taotai to work the Linchenghsien coal mine in Chihli. The mine will be worked by a Chinese company under Belgian supervision. Fifty per cent of the value of the coal taken out is to be paid as royalty to the Chinese Government, in addition to 1 *mace* for customs duty and 48 *cash* as bonus per ton. After the payment of interest, 10 per cent of the profits will be put to reserve, and the remainder divided between the Belgians and Chinese. The mine is close to the Pie Han trunk line.

MALAY STATES MINING ASSOCIATION.—According to one paper the Malay States Mining Association is in a bad way. The mining community will not subscribe enough to keep it going. To escape from being shut down, the association applied to the government for support by a charge on tin. The government would not hear of this unless the miners agreed. The miners would not listen to the idea. The association then debated how to find the way out. Some members thought that sending the hat round would be preferable to circulating a subscription list. Finally the following resolution was passed:—"That a subscription list be circulated among miners for subscriptions to meet the debts of the association, and that henceforth the subscription be $5 instead of $1 per mo."

MANCHURIA RICH IN GOLD.—American news says that Lewis Jerman, who spent 19 yrs. in Manchuria in the service of a Russian fur company, declares that the Amur River region is one of the richest gold sections in the world. He believes that Manchuria's wealth will be developed rapidly, now that the war is over, and that Manchuria is assured of protection from roving bands of Chinese. Jerman is preparing to return to the Orient, where he proposes organizing an expedition for exploiting part of Manchuria for gold. Being familiar with many languages he was enabled to obtain information from numerous foreigners and natives who were prospecting in various parts of Manchuria. He made several trips to Kamschatka, and found Northeast Siberia has many auriferous streams, which he believes will yield handsomely before the explorations of John Rosene's Northeast Siberian Company are completed. In 1889 Jeman crossed the Behring Sea and journeyed up the Yuken to Fort Selkirk on a fur-trading expedition.

MISCELLANEOUS NOTES

Spinning and Weaving Plant, Peking.—A spinning and weaving factory to provide occupation for the imperial concubines is to be introduced into the palace at Peking.

Bankruptcy Law of Siam.—The mercantile community in Bangkok, both European and Asiatic, has recently petitioned the Siamese Government to frame a bankruptcy law that will give greater protection against fraud but so far nothing has come of it.

Ice Factory, Kuala Lumpur, F. M. S.—Messrs Tiang Hin and Co.'s ice factory on the Ampang-rd, Kuala Lumpur, is in operation. The building contains the complete plant of American manufacture, necessary for the conduct of the business.

Reafforesting Abandoned Mining Areas, Federated Malay States.—Three thousand dollars have been set aside by the Government of the Federated Malay States for the reafforesting of abandoned mining areas in Perak, and $1,500 for the State of Selangor.

Boycott at Singapore.—The Singapore Boycott Committee recently ordered the coolies not to work on the repairs of an American ship at the Acme Docks, under threats of beheading. Thereupon the government ordered the coolies to resume work under pain of deportation if they failed to comply. Work was resumed the next day.

Big Sale of Manganese, Borneo.—The British Borneo Exploration Company, Ltd., has sold at a good profit 30,000 tons of Marudu Bay manganese for forward delivery during next year. This is most satisfactory and an excellent augury for the future. The company has not been very long in existence, but owing to the exertions of its energetic manager—Mr. J. C. Robertson—it has attained a success which bids fair to be continuous.

Census of Siam.—The Government of Siam has just completed a census of that kingdom. The population has been returned at 6,680 000, which is slightly higher than was expected. There are 5,699 Buddhist temples and 354 places devoted to other religions. The total number of houses is given at 1,053,781. There are 2,036 "domestic" elephants, 35,812 horses and ponies, 1,104,751 cattle, and 1,144,478 buffaloes. Under the heading of "vehicles" it is stated that there are 113,920 bullock and buffalo carts, and 293,519 boats. The population of Bangkok has still to be counted.

Tobacco Monopoly, Japan.—The Ministry of Finance in Japan recently issued a pamphlet, with diagrams and photographic reproductions of factories, respecting the tobacco monopoly of Japan. This document tells of the present working of the monopoly and the stages that it has gone through since its establishment. Altogether it shows the monopoly has been a distinct success, and that the profits for the year under consideration were -Y-27,500,000, and that 10 yrs. hence it is computed it will have reached -Y-46,000,000.

Trout Eggs for Philippines.—A recent American mail brought 140,000 trout eggs to the insular government of the Philippines. They come from the Imperial Fisheries Institute of Tokyo, and were put on board in three large cases at Yokohama. They were in charge of Professor T. Higurashi of the Imperial Fisheries Institute, who is caring for them at Manila. The development of the eggs was suspended on the voyage by applying ice, but they have been put into water of the proper temperature and are now hatching. The coming of the trout eggs is the result of efforts made by Commissioner Worcester, who negotiated with the Japanese Government through Huntington Wilson, American chargé d'affaires at Tokyo. When hatched the trout will be placed in the mountain streams of Benguet.

Lead Pencil Wood, Philippine Islands.—The Philippines may soon be a source of supply for the manufacturers of lead pencils in the United States. The supply of cedar is fast running low in the United States and samples of Philippine woods which may be used for this purpose have been requested for experiment by at least one firm of pencil manufacturers. There has been forwarded by the secretary of the interior to J. W. Musgrave, Farmington, Tennessee, the representative of the American Lead Pencil Company and brother of Dr. Musgrave of the Bureau of Science, a sample block of red calantas, the colored variety of the wood, which is used for carving purposes to such an extent in these islands. The wood is of spongy substance, is almost without grain and is strong and light. It is entirely without knots. The supply of calantas is almost unlimited, and with the introduction of railway system in the islands, which will tap the forests in which it grows, thus affording transportation facilities which will reduce the cost of exportation, it is estimated that competition for the trade of pencil manufacturers will be most profitable, should the specimen sent to the American Lead Pencil Company meet with all the requirements.

Japanese Commerce.—In the report by Special Agent Crist, he deals with the larger problems of Japanese commerce. He says the bulk of the empire's business is done by means of brokers and agents. Sample rooms play a most important part in the importing lines. The study of these will repay merchants and manufacturers seeking an entrance into oriental markets. English and German ways of working up and securing trade in the East are referred to and commented on favorably. In another report Mr. Crist furnishes American merchants and manufacturers with an excellent outline of the work being done in the business world in and about Kobé, a city that Mr. Crist puts at the head of the Japanese empire's importing and exporting centres. Mr. Crist deals in considerable detail with conditions affecting trade in the Kobé district, but common to all parts of the Empire. He points out the possibilities for certain lines, calls attention to the goods that are going in now, and to the kinds that might make their way if judiciously handled. He points to the delays due to incomplete and inadequate landing and handling facilities, citing the fact, however, that large deposits of goods now on the docks were rushed in to get ahead of a new tariff—not an uncommon thing in western countries. Parliament, it is thought, will put up a couple of millions of dollars to remedy this evil.

Far Eastern Petroleum Trade.—A corporation, called the Californian Petroleum Refineries, Ltd., has been formed in London with a capital stock of £200,000, all of the directors with the exception of one being Britons. The scene of the corporation's operations is to be in the United States with a new and independent departure in the methods of conducting the petroleum oil business. A majority of the company's stock is held by San Francisco investors, and the purpose is to erect and operate a refinery for the refining of crude petroleum and making therefrom the usual side products. Its site has not yet been secured, but it will be on the California Coast, and probably within a short distance of San Francisco. The basis of this deal is the property of the Graciosa Oil Company, which has 6,500 acres in Santa Barbara County, California, with four deep wells down and the fifth approaching completion, the production of which is estimated at 10,000 bbls. *per diem*. A pipe-line is to be constructed to Point Sal on the ocean, where a line of vessels will load the Graciosa oil for shipment to the refinery. The formation of the company was effected through the medium of Messrs. Jardine, Matheson & Co., of London, which firm has a large clientele in Eastern Asia, particularly in China and Japan, and has, it is understood, contracted to dispose of the Graciosa petroleum in the Far East after it has left the refinery. This oil is of the high grade of 27° and the company producing it is owned principally by Isaac Leibes and Henry J. Croker and their friends. Under the arrangement made by Isaac Leibes, the Graciosa Oil Company and the Californian Petroleum Refineries Ltd. will be able to act independently in the shipment, refining and marketing of their products, a statement which signifies much to those acquainted with the status of the petroleum industry in California.

FINANCIAL NEWS

Perak (F. M. S.) Expenditures, 1906.—Perak's share of federal expenditure for 1906 has been estimated at $4,452,428.

Shanghai Waterworks Company, Ltd.—The capital of this company will be increased to £327,000 by the creation of 9,150 new shares of £20 each.

Federated Malay States Investments.—Interest on investment made by the Government of the Federated Malay States is estimated to bring in an annual revenue of $116,000.

Russo-Chinese Bank.—A branch of the Russo-Chinese Bank has been opened at 41 Threadneedle-st., London. Mr. Chantrey Inchbald, London representative of the bank for 5 yrs., is the manager.

Postal and Telegraph Department, F. M. S.—The revenue of the F. M. S. Postal and Telegraph Department has been put down at $308,000. It is not yet self supporting as the expenditure is estimated at $440,721.

Kansai Railway Bond Loan.—A good deal of interest is being shown in London in the issue of £1,000,000 of 4½ per cent first mortgage debentures of the Kansai Railway Company, Ltd., Osaka, at an issue price of 97½ per cent.

Railway Traffic Estimate, Federated Malay States, 1906.—Four million dollars is the amount of the estimated receipts from passengers and freight traffic on the railways of the Federated Malay States during the current year.

Kwansai Railway.—Some attention has been given in the London market to the probably early issue of debentures of the Kwansai Railway for £1,000,000. The interest will be 4½ per cent, and the market has assumed that issue price will be 97½.

Japan Emigration Company.—It is announced that the Mitsui Bussan Kaisha intends buying up this concern, which was established at Yokohama with a capital of -Y-100,000, and to engage principally in the business of sending emigrants to Mexico. The capital will be increased to -Y-500,000.

Penang (Straits Settlements) Hills Railway.—At a recent extraordinary general meeting of the shareholders of the Penang Hills Railway Company, Ltd., it was decided to voluntarily wind up the affairs of the company, for which purpose Mr. A. F. G. Anderson, Penang, was appointed liquidator.

Japanese Loan.—The new Japanese loan, according to London advices, will be for £50,000,000 at 4 per cent interest, of which £25,000,000 have already been offered at the issue price of 90. Twelve million pounds have been placed in Paris, £6,500,000 in London, £3,250,000 in America, and the same amount in Berlin.

Selangor Estimates, 1906.—It is anticipated that the revenue of this Malay state will amount to $8,479,219, and the expenditure to $7,232,941; thus leaving a balance on the right side of $1,246,278. Land revenue and federal receipts are to be mainly responsible for this state of affairs, the latter item showing an increase of over $300,000.

Investments in Japan.—According to reliable statistics, the amount of foreign capital invested in Japanese industries at the beginning of the war in the N. was only $1,000,000 gold. The Tokyo Electric Light Company and the Hokkaido Colliery and Railway Company have respectively successfully negotiated foreign loans for $1,500,000 and $5,000,000 gold

Manila Railway Company, Ltd.—Sir Mortimer Durand, British ambassador at Washington, D. C., has had an interview with Secretary of State Root, with reference to the claim of the Manila Railway Company, Ltd., for $1,500,000, gold, damages, for the use of the Manila-Dagupan line by the American military authorities during the Spanish-American War, and the subsequent Filipino insurrection.

Duff Development Company, F. M. S.—The shareholders of this corporation have decided to increase the capital stock of the company to £500,000 by the creation of 100,000 additional ordinary shares of £1 each, ranking for dividend and in all other respects pari passu with the existing ordinary shares in the capital of the company. The Duff Development Company possesses what is considered good property in the State of Kelantan.

Selangor (F. M. S.) Estimates, 1906.—The Selangor estimates provide for a revenue of $8,479,219, and an expenditure of $7,232,941; thus leaving a balance on the right side of $1,246,278. Land revenue and federal receipts are mainly answerable for this state of affairs, the latter item showing an increase of over $300,000. A slight decline is anticipated in customs, licenses and municipal receipts. All these various works swell the total expenditure of the Public Works Department to the sum of $2,291,557.

Cathay, Ltd.—Cathay, Ltd., has been registered in London with a capital of £11,000 in 20,000 deferred shares of 1s. each, and 10,000 ordinary shares of £1 each. It is intended to seek and secure openings for the employment of capital in China, Japan, the Far East, and elsewhere; to acquire and deal with lands, buildings, mines, rights, concessions, etc. It is registered without articles of association, and there is to be no initial public issue. The registered office is 9 and 10 King-st, Cheapside, E. C.

Treasury Note Issue, Canton (China) Government.—The issue of treasury notes by the Canton Government has proved to be a profitable business. By order of the viceroy the notes are accepted at all government departments in payment of revenues and taxes. As a negotiable instrument the commercial community has found it to be a commodity of great convenience. The amount of notes at present in circulation is $700,000, and it is estimated that at the end of 1905 the profit derived from this note issue amounted to $100,000.

Negri Sembilan (F. M. S.) Estimates, 1906.—The Negri Sembilan estimates for the current (1906) year have been published. The revenue is placed at $2,281,-179, and the expenditure at $2,812,852, leaving an adverse balance of $531,673. The grand total estimated to be spent on public works throughout the state during the coming year is set down at $1,277,851, or not far from half of the total state expenditure. The amount to be spent on surveys only show an increase of some $4,500. The fact that the expenditure will be considerably in excess of the revenue need not arouse uneasiness for the state has a balance in hand.

Manchu Syndicate, Ltd.—The Manchu Syndicate, Ltd., has been registered in London, having a capital of £20,250 in 20,000 ordinary shares of £1 each and 5,000 deferred shares of 1s. each. The object is stated to be to acquire any concessions, rights, lands, mines, or other property in Eastern Asia or elsewhere, and particularly in Manchuria, China, Japan, and Korea; to develop and turn to account the same; to adopt an agreement with H. Collbran and H. R. Bostwick, and to carry on the business of miners, explorers, financiers, company promoters, bankers, underwriters, concessionaires, contractors, etc. No initial public issue.

Kansai Railway Bond Issue.—In connection with the recent issue of the Kansai Railway Company, it is pointed out that the price places the credit of the Kansai Railway at a higher basis than that of the government, and for an issue having an ample special hypothecation. The issue is, however, distinctlyinteresting, as it is the first under the law which grants foreigners the right to hold mortgages on Japanese railway undertakings. The allotments of debentures have been evidently heavier than applicants desired The price has fallen ¾ @ ½ discount for cash and ¼ discount ¼ premium for special settlement, whereas the price was 1¾ premium on the day of allotment.

Straits Trading Company, Singapore.—The net profits of the Straits Trading Company for the half year ended September 30th last, amount to $499,877.98, to which has to be added the balance of $84,222.49 brought forward from the last account. At the general meeting recently held at Singapore it was proposed that a dividend of $1 and a bonus of 50 cts. per share be paid on the 250,000 shares of $10 each; that $50,000 be added to the reserve fund, which will then stand at $850,000; that $50,000 be added to the fund for equalizing dividends, bringing it up to $150,000; that $15,000 be transferred to the employee's bonus account, and that the balance of $64,100,47 be carried forward.

Cowie Harbor Coal Company, Ltd.—This company has been registered in London with a capital of £100,000 in £1 shares, to acquire the business of the Sandakan Bay Coalfield, Ltd., including an agreement dated March 4th, 1904, for a concession granted by the British North Borneo Company, in connection with the coalfields in the Surudong District, British North Borneo, and the option to acquire a lease or leases in relation thereto; to adopt an agreement with the liquidator of the above-mentioned company; to examine and explore land in Borneo or elsewhere, and to carry on the business of miners, mining agents, coal owners, metal workers, brick manufacturers, etc. The registered office is 5 Whittington-ave, Leadenhall-st, E. C.

Manila Electric Railroad and Light Company.—The first annual statement of the Manila Electric Railroad and Light Company for the year ended September 1st, 1905, is as follows:—Net earnings, $273,580; interest charges, $123,028; surplus, $150,552 These figures are

in gold. In connection with this report it should be stated that while it is an annual one, the earnings up to April 10th were only for the sale of current for power and lighting purposes, as it was not until that date that the street railway system was opened to the public. There is still considerable work to be done before the railway and lighting system will attain its maximum efficiency, and even up to the present time the full mileage of the railway lines is not in operation.

Gold Standard, China.—The Board of Revenue and the Ministry of Finance of the Peking Government, in deliberating on the scheme for converting China into a gold standard country, recently took into consideration the recommendations made by Professor Jenks on his visit to that country last year, and were half inclined to adopt that gentleman's suggestions and establish a gold currency. Reviewing the question a second time, however, they discovered that the first thing required was gold bullion of which there was only a small quantity at present in China, and that, if foreign money were borrowed for the purpose, it would be only another source of letting money out of the country. After a long and full discussion, it was finally decided to abandon the scheme for the present.—*Nananfgpao.*

Federated Malay States Budget, 1906.—The Federated Malay States' estimates for 1906 show a revenue of $5,161,890 as against an expenditure of $8,453,463; or a deficit of $3,291,573—a loss which is accounted for by the fact that whereas the federal expenditure is incurred in numerous branches of the public services, the sources of its revenue are few. The receipts of the Postal and Railway Departments are expected to show considerable increase, since, with no income tax, the earning capacity of these two important branches of the service is perhaps the surest test as to whether the country is generally prosperous, or the reverse. The total estimated federal revenue shows an advance of $263,382 on the figures anticipated for this year. In the Mines Department, the absence of any further vote for the sinking of the deep shaft at Raub causes a considerable reduction on this year's figures. $15,000 is, however, to be spent on the purchase of boring tools.

Military Expenditure.— The war office establishment of four new divisions -Y-10,000,000; expenditure of troops in Korea and Manchuria, -Y-20,000,000; repairs, -Y-25,000,000.

The navy office increase of military expenditure, -Y-7,340,000; expenditure on Port Arthur Naval station, -Y-2,200,000; repairs, -Y-22,000,000; colliery works, -Y-160,000. Total, -Y-86,700,000.

Expenses for Enterprises in Manchuria.—The expenses for enterprises in Manchuria are not included in the budget. The government believes, however, that it will be able to obtain at least -Y-50,000,000 from Russia to reimburse the expense of maintaining the prisoners of war, and intends to divert the sum to Manchuria.

Expenses for Resident General Office and Embassies.—The expenses required for the establishment of Resident-general office in Korea are estimated at -Y-1,180,000 and those for embassies at -Y-390,000.

Loans for Fiscal Year.—The government has to raise over -Y- 316,500,000 by issuing domestic loans this year. In order to effect the issue, the government will redeem the outstanding domestic loans of a higher rate of interest, by using -Y-250,000,000 of the foreign loan just issued, and take advantage of the slackening of the money market, due to this redemption, to issue the proposed domestic loans.

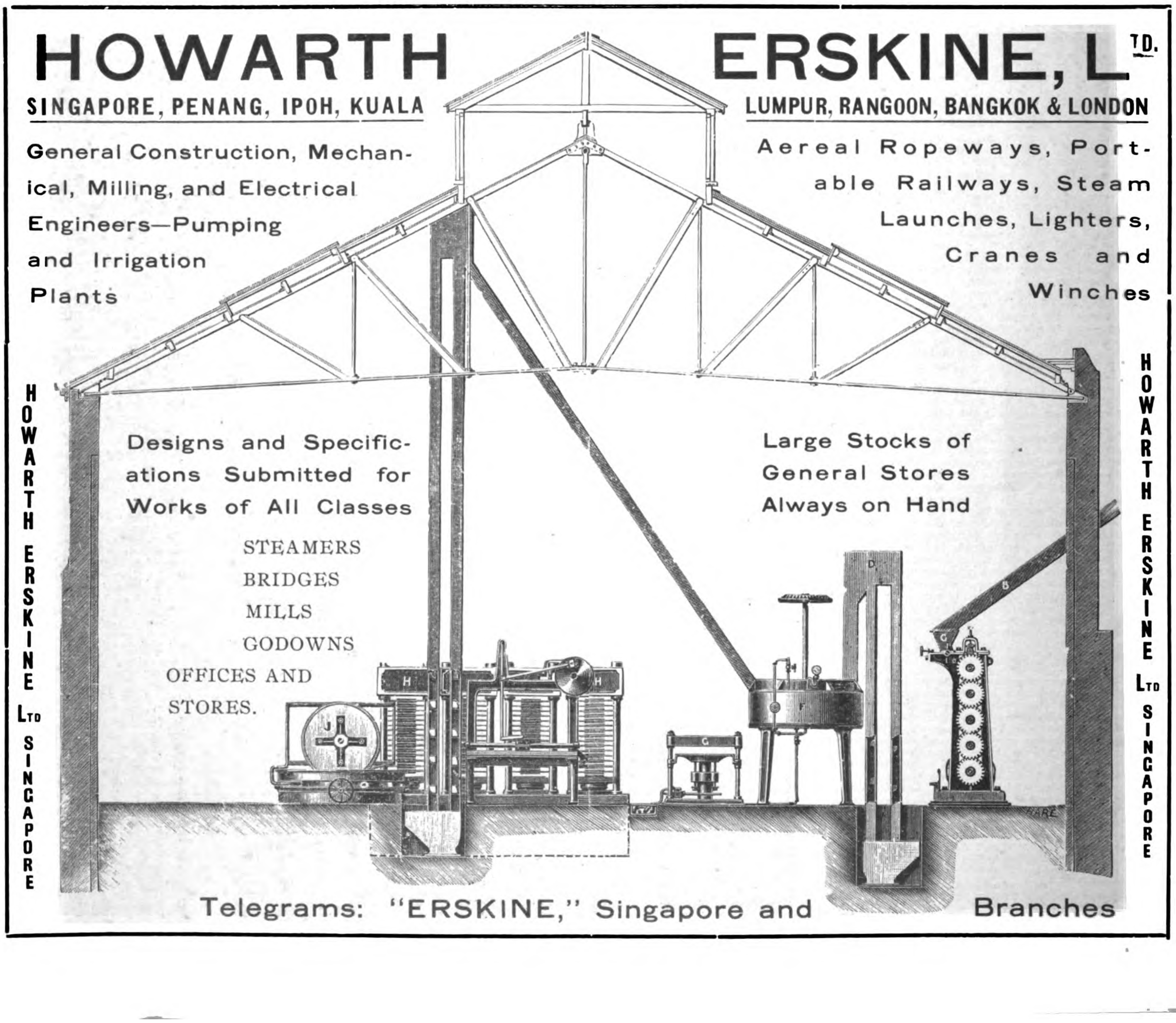
COMMERCIAL VALUE OF THE COCOANUT IS ENHANCED BY SCIENTIFIC CULTURE OF THE PALM

(Concluded from page 219.)

interior. After lying for 1 mo. the nuts were put through the regular process for making copra. The weight in pounds of the whole nut, husks, meat and shells, dried shells, and copra was determined directly on an ordinary Fairbanks scale, the meat and milk being obtained by difference. Five hundred nuts from each lot were sun dried and 500 grill dried and the resulting weight of copra multiplied by two to give the yield of 1,000 nuts by each method. For the determination of moisture and oil in this copra, twenty samples were taken from each lot, cut into small pieces, and quartered down to about 100 grams. Following are the most important results of this analysis:—

Series XII.—*Seashore Nuts*—Sun dried: Copra 302.1 kilos, 12,8 per cent; oil 182.2 kilos, 7.7 per cent. Grill dried: Copra 330.2 kilos, 14.0 per cent; oil 198.9 kilos, oil 8.4 per cent, *Inland Nuts*—Sundried: Copra, 322.9 kilos, 14.1 per cent. Grill dried: Copra 333.0 kilos. 14.6 per cent; oil 189.8 kilos, 8.3 per cent.

This work, performed as it was on a large scale, agrees rather more closely with the results obtained from the series of ten nuts each than was to be expected. Given perfectly sound cocoanuts, the two methods of drying should produce equal amounts of copra, and the figures obtained in this last series on a commercial basis establish, even more firmly than do the results of the analyses alone, the fact that there is practically no difference in quality between the nuts gathered along the seashore and those from farther inland. They should also be of some value as representing the average yield in copra and oil from nuts produced in the southern parts of the Philippine Archipelago.



FAR EASTERN SHARE QUOTATIONS

Courtesy of Benjamin, Kelly & Potts, Sharebrokers, Hongkong, January, 1906.

Stock	When Established	Capital	No. of Shares	Value	Paid Up	Reserve	At Working Account	Date	Last Dividend	When Paid	Approximate Return at Present Quotation* Per cent	Closing Quotations
Banks.												
Hongkong and Shanghai Banking Corporation	1865	$10,000,000	80,000	$125	$125	g £1,000,000 s $8,500,000 i $250,000	$1,702,728	30-6-05	£1.15/- at exchange 1/10½= $18.66.67 for first half-year 1905	21-8-05	5	$895 London £93
National Bank of China, Limited	1891	£699,475	99,925	£7	£5	$200,000	$41,768	31-12-04	$2 (London 3/6) for 1903	1-2-04	—	$38 buyers
Marine Insurances.												
Canton Insurance Office, Limited	1881	$2,500,000	10,000	$250	$50	$1,600,000 j $147,895	$211,540	31-12-04	$20 for 1904	21-10-05	6½	$315 sellers
China Trader's Insurance Co., Ld.	1865	$2,000,000	24,000	$83.33	$25	$950,000 f $169,215 j $202,455 u $296,955	Nil.	30-4-05	$4½ for year ended 30-4-1905	18-12-05	5	$90 buyers
North China Insurance Co., Ld.	1863	£150,000	10,000	£15	£5	g £100,000 s Tls. 100,000 f Tls. 50,000	Tls. 302,053	30-6-05	Final of 7/6 making 15/- for 1904	25-10-05	5½	Tls. 95
Union Insurance Society of Canton, Limited	1867	$2,500,000	10,000	$250	$100	s $2,000,000 g £40,000 f $331,453 j $1,043,930 u $1,152,346	$2,339,112	30-6-05	$40 for 1904	20-10-05	5½	$720 buyers
Yangtsze Insurance Association, Ld.	1862	$800,000	8,000	$100	$60	$750,000 i $50,000 j $5,890	$599,364	31-12-05	$12 and $3 special dividend for 1903	12-4-05	8½	$170
Fire Insurances.												
China Fire Insurance Co., Ld.	1870	$2,000,000	20,000	$100	$20	$1,000,000 x $218,039 f $2,241	$260,374	31-12-04	$6 dividend and $1 bonus for 1903	10-3-05	8	$90 buyers
Hongkong Fire Insurance Co., Ld.	1868	$2,000,000	8,000	$250	$50	$1,200,505	$360,372	31-12-04	$34 for 1903	7-3-05	11	$330
Shipping.												
China and Manila Steamship Co., Ld.	1882	$750,000	(1) 30,000	$25	$25	$5,000	$8,832	31-12-04	$1 for 1904	27-3-05	5	$20 sales
Douglas Steamship Co., Ld.	1883	$1,000,000	20,000	$50	$50	$261,638 i $88,941	Nil.	30-6-05	$3½ for year ended 30-6-1905	25-9-05	9½	$36½ buyers
Hongkong, Canton and Macao Steamboat Company, Ld.	1865	$1,200,000	80,000	$15	$15	e $250,000 di $600,000 f $145,376	$8,064	30-6-05	$1 for first half-year 1905	16-8-05	8	$25½ buyers
Indo-China Steam Navigation Company, Ld.	1882	£1,200,000	(2) 60,000	£10	£10	£120,000 i £241,150 h £3,999	£4,435	31-12-04	12/- @ 1/10 ⅞=$6.29.51 for 1904	13-7-05	7	$92
Shanghai Tug and Lighter Co., Ld. Do. Preference	1903	Tls. 1,500,000	200,000 100,000	Tls. 50	Tls. 50	i Tls. 25,000	Tls. 43,762	31-12-04	Interim of Tls. 2. for 1905 Interim of Tls. 1¾ for 1905	28-8-05	8 8	Tls. 55 buyers Tls. 47 buyers
"Shell" Transport & Trading Co., Ld.	1898	£2,000,000	2,000,000	£1	£1	£400,000 i £4,144	£7,815	31-12-04	1/- (Coupon No. 6) for 1905	1-1-06	4½	22/6 ex div.
"Star" Ferry Co., Ld.	1898 1900	$200,000	10,000 10,000	$10 $10	$10 $5	$65,000 i $24,257	$929	30-4-05	$1.80 90 cents for year ended 30-4-1905	29-5-05	5¾ 4	$32 sellers $23 sellers
Straits Steamship Co., Ld.	1890	$500,000	(3) 5,000	$100	$100	$400,000 e $21,075 i $130,153	$21,231	31-12-04	$10 for 1904	21-3-05	7	$149 buyers
Taku Tug & Lighter Co., Ld.	—	T.T 1,500,000	30,000	T. Tls. 50	T. Tls. 50	Tls. 98,000 d Tls. 195,479 e Tls. 28,000 i Tls. 81,200	Tls. 4,333	31-12-04	Interim of Tls. 2 for 1905	27-7-05	9¼	Tls. 35 buyers
Refineries.												
China Sugar Refining Company, Ld.	1878	$2,000,000	20,000	$100	$100	e $450,000 r $150,000	$42,812	31-12-04	Interim of $10 for 1905	18-8-05	10	$205
Luzon Sugar Refining Company, Ld.	1882	$700,000	7,000	$100	$100	none	Dr. $85,987	31-12-04	$3 for 1897	24-3-98	—	$25 sales
Perak Sugar Cultivation Co., Ld.	—	Tls. 350,000	7,000	Tls. 50	Tls. 50	Tls. 100,000	Tls. 3,723	31-7-05	Tls. 2½ for year ending 30-9-1904	17-12-04	—	Tls. 62 sales
Mining.												
Chinese Engineering & Mining Co., Ld.	1901	£1,000,000	1,000,000	£1	£1	d £80,000 h £12,289	£13,355	28-2-05	Final of 1/- (No. 5)	2-11-05	—	Tls. 9 sales
Oriental Consolidated Mining Co., Ld.	1901	G. $5,000,000	y 500,000	G. $10	G. $10	none	G. $672,093	31-12-04	50 cts. final mak. G. $1 for '05 (No. 5)	21-12-05	—	G. $16½
Raub Australian Gold Mining Co., Ld.	1892	£200,000	150,000 50,000	£1 £1	18/10 £1	£4,873	Dr. £8,745	31-3-05	No. 12 of 1/-=48 cents	28-1-01	—	$4½

STOCK	WHEN ESTABLISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation.* PER CENT	CLOSING QUOTATIONS
Docks, Wharves and Godowns.												
Farnham (S. C.), Boyd & Co., Ld	1901	T5,520,000	55,200	T100	T100	T1,000,000	T34,924	30-4-05	Final of T8 making T13 for 1904/05	24-6-05	10½	T124 sellers
Fenwick (Geo.), & Company, Ld.	1889 1905	$450,000	6,000 z 12,000	$25	$25	$70,000	$8,577	31-12-04	$3¼ for 1904, on 6,000 shares First year	13-3-05 —	— —	$25 buyers $24½ buyers
Hongkong and Kowloon Wharf and Godown Co., Ld.	1886	$2,000,000	40,000	$50	$50	$250 000 d.r. $58,423 i $10,000 p $300,000	$29,422	31-12-04	Interim of $2½ for 1905	26-7-05	4¾	$108 buyers
Hongkong & Whampoa Dock Co., Ld.	1901	$2,500,000	50,000	$50	$50	i $41,500	$501,332	30 6-05	$6 for first half year '05	22-8-05	8	$164
New Amoy Dock Co., Ld.	1892	$67,500	10,000	$6¾	$6¾	$55,500	Dr. $10,260	31-12-04	$1¼ for 1903	5-5-04	7	$17
Shanghai and Hongkew Wharf Co. Lt.	1902	T3,200,000	32,000	T100	T100	b T487,210 r T59,880	T10,711	31-12-04	Interim of T6 for 1905	23-8-05	5¾	T225 buyers
Yangtsze Wharf and Godown Co., Ld.	1902	T250,000	2,500	T100	T100	T17,500	T2,762	31-12-04	T18 for 1904	29-3-05	9¼	T190 buyers
Lands, Hotels and Buildings.												
Astor House Hotel Co., Ld.	1901	$750,000	(4) 30,000	$25	$25	$14,156	$9,028	30-6-05	$2½ for year ending 30-6-1905	19-8-05	9	$28 sales
Astor House Hotel, Ld. (Tientsin)	—	T. T100,000	2,000	T. T50	T. T50	T34,000 e T8,000	T806	29-2-05	Interim of T5	21-10-05	8	T130 buyers
Central Stores, Ld. Do. (Founders')	—	$91,845	6,000 123	$15 $15	$12 $12	$20,000	$1,502	31-12-04	Final of 60 cents making $1.80 for '04 None	30-3-05 —	12 —	$15 $100
Do. (New Issue)	1904	$360,000	24,000	$15	$7½				Preferential of 7% for '04	30-3-05	7	$7½ sales
Hongkong Hotel Co., Ld.	1866	$600,000	12,000	$50	$50	$648,975 r $31,087	$10,126	30-6-05	$5 for first half-year 1905	4-9-05	6¾	$150 sales
Hongkong Land Investment and Agency Co., Ld.	1889	$5,000,000	50,000	$100	$100	e $250,000	$37,875	31-12-04	Interim of $3½ for 1905	27-7-05	5½	$125 sales
Hotel des Colonies Co., Ld. (Shanghai)	1902	T225,000	9,000	T25	T25	n T20,986	T7,202	31-3-05	Interim of T1	1-11-05	15	T16 sellers
Hotel Metropole Company, Limited	1904	$200,000	2,000	$100	$100	none	$4,699	30-6-05	Final of $6 making $10 for the year	26-7-05	9¾	$102½
Humphreys' Estate & Finance Co., Ld.	1887	$1,500,000	150,000	$10	$10	i $200,994 e $50,000	$11,958	31-12-04	90 cents for 1904	11-2-05	7	$13
Kowloon Land and Building Co., Ld.	1889	$300,000	6,000	$50	$30	none	$377	31-12-04	$3 for 1904	31-1-05	7½	$41
Shanghai Land Investment Co., Ld.	1901	T2,600,000	52,000	T50	T50	T828,813 e T170,000	T40,066	31-12-04	Interim of T3 for 1905	21-7-05	6¾	T120 sellers
Tientsin Hotel des Colonies, Ld.	1903	T70,000	1,400	T50	T50	none	T670	31-12-04	Interim of T3 for 1905	4-7-05	12	T45 sellers
Tientsin Land Investment Co., Ld.	1902	T772,600	7,726	T100	T100	i T67,300	T725	31-12-04	Interim of T3 for 1905	2-8-05	6	T115 sellers
West Point Building Co., Ld.	1889	$625,000	12,500	$50	$50	none	$1,247	31-12-04	Interim of $1¼ for 1905	27-7-05	6¾	$55 sales
Cotton Mills.												
Ewo Cotton Spinning and Weaving Co., Ld.	1895	T1,000,000	(5) 20,000	T50	T50	T45,939	T100,000	31-10-05	T8 for year ended 31-10-1904	18-12-05	18¼	T44 sellers
Hongkong Cotton Spinning, Weaving and Dyeing Co., Ld.	1901	$1,250,000	125,000	$10	$10	e $30,000	$23,264	31-7-05	$1 for year ended 31-7-1905	4-9-05	7¾	$13
International Cotton Manufacturing Co., Ld.	1895	T750,000	(6) 10,000	T75	T75	T100,000	T18,718	30-9-05	Interim of 3% a/c 1898	30-4-98	—	T40 buyers
Laou-kung-mow Cotton Spinning & Weaving Co., Ld.	1895	T800,000	(7) 8,000	T100	T100	none	T10,000	31-12-04	Interim of 4% a/c 1898 on 6,000 shares	1-8-98	—	T54 sellers
Soey Chee Cotton Spinning Co., Ld.	1895	T1,000,000	2,000	T500	T500	l T5,658	T22,051	31-12-04	4% for 1897	2-2-88	—	T250 buyers
Miscellaneous.												
Anglo German Brewing Co., Ltd.	1904	$100,000	4,000	$100	$100	none	$20	31-12-04	None	—	—	$100
Bell's Asbestos Eastern Agency, Ld.	1895	£5,377.10s	8,604	12/6	12/6	£314	£770	31-12-04	1s. 3d per share for 1904	21-7-05	9	$7¼ sales
Campbell, Moore & Co., Ld.	1886	$12,000	1,200	$10	$10	$8,000	$1,182	31-12-04	$3 for 1904	1-4-05	8¼	$36
China-Borneo Co., Ld.	1903	$720,000	(8) 60,000	$12	$12	none	—	31-12-04	$1 for 1904	17-3-05	10	$10 sellers
China Flour Mill Co., Ld.	—	T200,000	4,000	T50	T50	T30,000	T718	31-12-04	Interim of T5 for 1905	24-7-05	—	T80 sellers
China Light and Power Co., Ld.	1901	$500,000	50,000	$10	$10	none	$3,739	29-2-04	None	—	—	$10
China Provident Loan and Mortgage Co., Ld.	1898	a $1,000,000	100,000	$10	$10	$80,000	$1,581	31-12-04	80 cents for 1904	18-1-05	9	$9
Dairy Farm Company, Ld.	1896	$187,500	25,000	$7½	$6	$25,000	$2,864	31-7-05	$1.20 for year ending 31-7-1905	24-11-05	7¾	$15½ buyers

STOCK	WHEN ESTAB-LISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation* PER CENT	CLOSING QUOTATIONS
Miscellaneous.—Continued												
Green Island Cement Co., Ld	1889	$1,500,000	150,000	$10	$10	*p* $400,000 / $500,000	$95,054	31-12-04	$2 for 1904	27-2-05	7	$28½
Hall & Holtz, Ld.	—	$420,000	21,000	$20	$20	$186,000	$7,551	29-2-05	Final of $1½ making $2½	15-4-05	10	$25½ sales
Hongkong Electric Co., Ld.	1889 / 1899	$600,000	30,000 / 30,000	$10 / $10	$10 / $10	none	$2,151	30-4-05	$1.00 / 50 cents } for year ending 30-4-05	17-7-05	6¾ / —	$15 buyers / $14½ buyers
Hongkong High-Level Tramways Co., Ld.	1887	$125,000	1,250	$100	$100	$50,000	$2,796	30-11-04	$15 for year ending 30-11-04	24-12-04	7	$225
Hongkong Ice Company, Ld.	1881	$125,000	5,000	$25	$25	*k* $60,000	$5,356	31-12-04	Interim of $4 for 1905	2-8-05	7	$235
H'kong Rope Manufacturing Co., Ld.	1883	$500,000	10,000	$50	$50	$60,000	$11,137	31-12-04	$10 for 1904	10-4-05	7	$152 buyers
Hongkong Steam Waterboat Co., Ld.	1900	$150,000	15,000	$10	$10	$2,500	$88	30-9-05	Final of 50 cents making $1 for year ended 30-9-1905	24-11-05	7¾	$13 sellers
Lane, Crawford & Co., Ld. (Shanghai)	1903	$250,000	2,500	$100	$100	none	$42,009	29-2-05	Interim of $5	20-11-05	9½	$145
Maatschappij tot Mijn-, Bosch-en Landbouwexploitatie in Langkat	1902	Gs.2,500,000	25,000	G.100	G.100	*i* T528,210 / T19,465	T35,849	31-10-04	4th quarterly dividend of T7½ making in all T22½ for '05	15-12-05	10¾	T210 buyers
Mondon, (E. L.) Ld.	1902	T350,000	7,000	T50	T50	none	*Dr.* T117,638	31-12-04	T5 for 1902	2-5-03	—	T25 sellers
Philippine Company, Ld.	1904	$675 000	67,500	$10	$10	none	*Dr.* P53,619	31-12-04	None	—	—	$5 buyers
Shanghai and Hongkong Dyeing and Cleaning Co., Ld.	1903	$60,000	1,200	$50	$50	none	*Dr.* $16,455	31-8-05	None	—	—	$50
Shanghai Gas Co., Ld.	1903	T800,000	16,000	T50	T50	*d* T145,000 / T108,172	T8,011	31-12-04	Interim of T3½ for 1905	26-7-05	7	T128 buyers
Shanghai Horse Bazaar Co., Ld.	1904	T270,000	5,400	T50	T50	T45,000	T9,751	31-12-04	T6 for 1904	17-3-05	9	T67½
Shanghai Pulp and Paper Co., Ld.	—	T450,000	4,500	T100	T100	T25,000	T6,968	31-12-04	Interim of T6 for 1905	22-7-05	9	T150 sellers
Shanghai Sumatra Tobacco Co., Ld.	1902	T600,000	(9) 30,000	T20	T20	*w* T24,820 / T25,000	T1,297	31-10-04	Interim of T2	20-10-05	14	T65 sellers
Shanghai Waterworks Co., Ld.	1881	£144,000	7,200	£20	£20	T170,000	T17,220	31-12-04	Interim of 15/- for 1905	27-7-05	4½	T450 buyers
South China Morning Post, Ld.	1903	$150,000	6,000	$25	$25	none	*Dr.* $5,068	29-2-05	None	—	—	$20
Steam Laundry Co., Ld.	1902	$100,000	20,000	$5	$5	none	$1,134	31-5-05	50 cents for year ended 31-5-05	20-11-05	7	$7
Straits Ice Company, Ld.	1884	$200,000	2,000	$100	$100	$25,000	$700	31-12-04	$5 account 1905	...-2-05	—	$160 buyers
Tientsin Waterworks Co., Ld.	1901	T. T200,000	2,000	T. T100	T. T100	*e* T15,259 / T4,000	T1,012	30-4-05	Final of T4½ making T8½ for '04/5.	17-6-05	7½	T. T115 buyers
United Asbestos Oriental Agency, Ld. / Do. do (Founders')	1896	$100,000	9,900 / 100	$10 / $10	$4 / $10	$22,000	$551	31-5-05	80 cents / $19.80 } for year ended 31-5-05	29-7-05	9 / 11	$9 / $180
Watson (A. S.) & Co, Ld.	1886	$900,000	90,000	$10	$10	$300,000 / $25,000	$6,096	31-12-04	Final of 50 cents making $1 for '04.	29-5-05	7¾	$13 sales
William Powell, Ld.	1901	$150,000	15,000	$10	$10	*e* $4,500	$676	30-6-05	Interim of 50 cents for 1905	25-11-05	11	$10½ buyers

LOANS AND DEBENTURES	AGENTS FOR THE LOAN	AMOUNT OF LOAN	PAR VALUE	OUT-STAND'G BONDS	WHEN PAYABLE	CLOSING QUOTATIONS
China Government, 7 per cent. Silver Loan 1886 E.	Hongkong & Shanghai Bkg. Cor.	T767,200	T250	1969	Mar. 31st & Sept. 30th each year until Mar. 31st, 1917.	par. (Plus accrued interest)
Hongkong Hotel Co., Ltd., 6% Mortgage Debentures of 1899‡	Hongkong & Shanghai Bkg. Cor.	$500,000	$500	§ all	Half yearly, June 30th and December 31st	par. (Plus accrued interest)
Shanghai & Hongkew Wharf Company, Ltd. 6% Debentures of 1902	Hongkong & Shanghai Bkg. Cor.	T543,900	T100		Half yearly, June 30th and December 31st	T97 (Plus accrued interest)
Astor House Hotel Co., Ltd. 8% Debentures of 1903	Hongkong & Shanghai Bkg. Cor.	T500,000	T100		Half yearly, January 1st and July 1st	T104 (Plus accrued interest)
Chinese Engineering & Mining Co., Ltd., 6% Debentures of 1903†		£500,000	¶	£431,960	Half yearly, June 30th and December 31st	par. (Plus accrued interest)
International Cotton Manufacturing Co., Ltd. 6% Debentures of 1901	Russo Chin. Bk.	T500,000	T100		Half yearly, March 31st and September 30th	par. (Plus accrued interest)

a Authorized capital $2,000,000
b Building Reserve Account.
c Capital Reserve Fund.
d Depreciation Fund.
e Equalization of Dividend Fund.
f Exchange and Investment Fluctuation Account.
g Gold Reserve Fund
h Exchange Reserve Account.
i Insurance Fund.
j Reinsurance Fund.
k Contingencies Account.
l Legal Reserve Fund.
m
n Sinking Fund.
o
p Premium on New Issue.
q
r Repairs and Renewals Account.
s Silver Reserve Fund.
t
u Underwriting Suspense Account.
v
w Special Works Fund.
x Extra Reserve Fund.
y 75,000 owned by the Company.
z 6,000 shares unissued.
1 5,725 shares unissued.
2 First issue of 60,000 of which 10,411 unallotted.
3 785 shares unissued.
4 7,600 shares unissued.
5 5,000 shares unallotted.
6 1,616 shares unallotted.
7 842 shares unissued.
8 14,000 shares unissued.
9 17,000 shares unissued.
* Based on last year's dividend.
|| Only Tls. 134,000 taken up.
§ 268 held by the Company.
¶ In certificates of £20 and £100
‡ Redeemable in 10 years, or at option of Company the Company giving 6 months' notice.
† Redeemable at par at rate of £10,000 per annum from 31st December, 1903, to 31st December, 1952
Dr. Deficit.

SINGAPORE SHARE QUOTATIONS.

COURTESY MESSRS. FRASER & CO., BROKERS, SINGAPORE, JANUARY, 1906.

NAME	DATE OF FOR-MATION	CAPITAL	CAPITAL PAID UP	NO. OF SHARES	ISSUE VALUE	PAID UP	RESERVE	LAST DIVIDEND	SINCE LAST MAIL HIGHEST	SINCE LAST MAIL LOWEST	CLOSING QUOTATIONS
Mining.									$	$	$
Bersawah Gold Mining Co., Ld.	1900	$175,000	115,000	13,500 [1]	10	10					15.00 sales
" " " " " Deferred.				4,000	10	10					8.00 sellers
Bruseh Hydraulic Tin Mining Co., Ld.	1901	$600,000	600,000	60,000	10	10			10.00	9.25	9.25 sellers
Kadana Gold Mining Co., Ld.	1901	$300,000	300,000	20,000	10	10					2.00 sellers
" " " " " Pref.				10,000	10	10					10.00 nominal
Kechau Goldfields, Ld. *Fully paid*	1902	£30,000	16,175.7/-	6,207	1	1					3.00 sellers
" " " *Contrib.*				23,793 [2]	1	19/-					2.00 sellers
Kuantan Tin Mining Co., Ltd.	1905	$150,000	99,000	15,000 [22]	10	10			11.00	10.00	11.00 sales
Pahang Corporation, Ld.	1889	£250,000	244,306	244,306	1	1	20,000	3 per cent for year ending 30 6-02			2.00 sellers
Pahang Kabang, Ld.	1890	£375,000	375,000	360,000	1	1					0.25 sellers
" " " *Pref.*				15,000	1	1					nom.
Queensland Raub G. M. Co., Ld. *Fully paid*	1901	£146,700	100,866	36,700	1	1					nom.
" " " " *Contrib.*				110,000	1	11/8					0.30 sellers
Raub Aust. Gold Ming. Co., Ld. *Fully paid*	1892	£200,000	191,250	50,000	1	1	4,873	1s. paid January, '01			3.50 nom.
" " " " " *Contrib.*				150,000	1	18/10		1s. " " "			3.25 sales.
Redjang Lebong Mining Co.	1898	f.2,000,000	1,800,000	20,000 [3]	100	100		22 9-10% for year ending 31-12-04			425.00 sales.
Royal Johore Tin Mining Co., Ld.	1900	$220,000	220,000	22,000	10	10		5 " for year ending 15-2-04	3.50	3.10	3.50 buyers
Sipiau Tin Co., Ld.	1899	$230,000	230,000	23,000	10	10		5 " for ½ year ending 30-6-05			5.25 buyers
The Belat Tin Mining Co., Ld.	1903	$300,000	300,000	30,000	10	10			5.00	4.50	4.50 sellers
Tronoh Mines, Ld.	1902	£160,000	149,185	160,000 [4]	1	1		7s. paid during 1905	20.75	20.25	20.25 sellers
Duff Development Co., Ld.	1903	£400,000	350,000	400,000 [5]	1	1					8.00 sellers
Rubber.											
Batu Unjor Rubber Co, Ltd.	1905	£700,000	610,000	61,000	10	10			24.00	20.00	$24.00 sellers
Bukit Rajah Rubber Co.	1903	$70,000	61,000	70,000 [6]	1						£3.17s. 6d.
Balgownie Rubber Estate Ld.	1905	$200,000	100,000	20,000	10	6					......
Cicely Rubber Estates Co.	1904	£12,000	10,500	6,000	1						£2 5s. od.
" " " 5% Pref.				6,000 [7]	1						£2 5s. od.
Pataling Rubber Estate Syndicate	1903	£30,000	17,500	30,000 [8]	1	1					£5 5s. od.
Ribu Planting Co. Ld.	1904	$200,000	135,000	2,000 [9]	100	100					$270.00
Sandycroft Rubber Co.	1904	$100,000	85,000	1,000 [10]	100	100					$188.00 buyers.
Selangor Rubber Co. Ld.	1898	£30,000	26,000	30,000 [11]	1	1					£7 17s. 6d.
Sione Rubber Company, Ld.	1904	$100,000	88,000	1,000 [12]	10	10					$15.00
Singapore & Johore Rubber Co. Ld.	1903	$100,000	78,750	150	100	100					$150.00 sellers
" " " " " " *Contrib*				850	100	75					100.00 buyers.
Sungei Way Rubber Co. *Fully paid*	1904	£50,000	13,920	6,920	1	1					£2 3s. od.
" " " " *Contrib.*				43,080 [13]	1	5/-					£1 9s. od.
Vallambrosa Rubber Co.	1904	£60,000	50,000	60,000 [14]	1						£4 17s. 6d.
General.											
Fraser & Neave, Ld.	1898	$225,200	225,000	4,500	50	50	112,500	10 p. ct. and 2½ per cent bonus for '04			105.00 sellers.
Hogan & Co., Ld.	1904	$480,200	334,800	3,348	100	100	5,000	7 per cent for 1904			40.00 sellers
H'kong and Shanghai Banking Corporation	1865	$10,000,000	10,000,000	80,000	125	125	10,000,000 [18] 8,500,000 250,000 [19]	35s. for ½ year ending 30-6-05			850.00
Howarth Erskine, Ld.	1901	$1,200,000	1,200,000	12,000	100	100	275,000	10% and 5% bon. for yr. end. 30-6-05	275.00	270.00	275.00 sales
Maynard & Co., Ld.	1901	$34,000	34,000	3,400	10	10		15 per cent for year ending 31-10-05			23.00 sellers
Riley, Hargreaves & Co., Ld.	1899	$875,000	875,000	6,000	100	100	150,000	10 p. ct. and 2½ p. ct. bon. for year '04			200.00 sellers
" " " " " 7% Pref.				2,750	100	100		7 p. ct. for year 1904			115.00 buyers
Singapore Cold Storage Co., Ld.	1903	$600,000	240,000	24,000 [15]	10	10					10.00 sales
Singapore Dispensary Ld.	1891	$30,000	30,000	600	50	50	19,000	12½ per cent for year ending 31-7-04			72.50 sellers
Straits Ice Co., Ld.	1884	$200,000	200,000	2,000	100	100	22,000	5 " interim for 1905			150.00 buyers
Straits Steam Ship Co., Ld.	1890	$500,000	421,500	5,000 [16]	100	100	400,000 169,228 [20]	5 p. ct. interim for 1905			150.00 sellers
Straits Trading Co., Ld.	1887	$3,000,000	2,500,000	300,000 [17]	10	10	700,000 1,021,395 [21]	10 p.ct. & 5 p.ct. bon. ½ yr. end. 30-9-05	42.25	42.00	42.25 sellers
Tanjong Pagar Dock Co., Ld.	1864	$3,700,000	3,700,000	37,000	100	100	1,950,000	$20 for half year ending 31-12-04		460.00	475.00 sales
Debentures. $											
Howarth Erskine Ld. 7 per cent ... 250,000											3 per cent prem.
Singapore Municipal 6 " ... 400,000											3 ,, nominal.
" " 5 " ... 1,878,000											3 ,, prem buyers.
" " 4 " ... 602,300											2 ,, dis. nominal.
Riley, Hargreaves & Co., Ld. 6 p. cent 225,000											3 ,, prem buyers.
Tanjong Pagar Dock Co., Ld. 6 " 250,000											2 ,, prem nom.
" " " " 5 " 1,365,500											1 ,, prem.

1 3,500 unissued.
2 13,300 "
3 2,000 "
4 10,815 "
5 50,000 unissued.
6 9,000 "
7 1,500 "
8 12,500 " Mort. £5,000
9 650 unissued
10 150 "
11 4,000 "
12 1,200 "
13 8,080 unissued.
14 10,000 "
15 36,000 "
16 785 "
17 50,000 "
18 Special Gold Reserve Fund.
19 Insurance Fund.
20 Sundry Reserves.
21 Sundry Reserves.
22 5,100 unissued.

YOKOHAMA SHARE QUOTATIONS

COURTESY A. C. HUTTON POTTS, SHARE AND GENERAL BROKER, YOKOHAMA, DECEMBER, 1905.

STOCKS.	CAPITAL.	NO. OF SHARES.	ISSUE VALUE.	AMOUNT PAID UP.	RESERVE FUND.	AT WORKING ACCOUNT OR CARRIED FORWARD.	DATE.	LAST DIVIDEND.	FOR TERM.	CLOSING QUOTATION.
	Y.		Y.	Y.						
Brett & Co., Limited	28,000	2800	10	10			30/6/03	6%	for 1 year	7 Nominal.
Club Hotel, Limited	185,000	1850	100	100			31/3/04	7%	,, 1 year	50 Nominal.
Grand Hotel, Limited	250,000	2500	100	100		Y.2,608.34	30/6/05	6%	,, ½ year	225 Nominal.
Helm Bros., Limited	186,000	3720	50	50		Y.8,349.06	31/12/04	17½%	,, 1 year	77½ Sales.
Langfeldt & Co., Limited	150,000	1500	100	100		Dr.30,174.81	30/6/05		,, ½ year	35 Buyers.
C. Nickel & Co., Limited	125,000	5000	25	25		10,572.91	31/10/04	16%	,, 1 year	32½ Sellers.
Japan Brewery Company, Limited	450,000	9000	50	50	170,000	4,781.87	31/12/04		,, 1 year	130 Sellers.
Yokohama Engine and Iron Works	130,000	2600	50	50	20,000	Y.5,935.35	31/5/05	20%	,, 1 year	120 Sellers.
Hirano Mineral Water Co., Ltd.	125,000	5000	25	25				1st year		25 Sellers.
Oriental Hotel, Ltd., Old Ordinary		1490	50	50			31/8/05	12%	,, 1 year	75 Nominal.
,, ,, New ,,		1510	50	25						
,, ,, Old Preference	251,000	750	50	50	60,542.50			8%		63 Sales.
,, ,, New ,,		1250	50	25						
,, ,, Founders		80	12½	12½				Y.37		500 Sales.

DEBENTURE LOANS.	AMOUNT OF LOAN.	FACE VALUE OF DEBENTURES.	RATE OF INTEREST.	INTEREST PAYABLE.	CLOSING QUOTATION.
Japan Brewery Company, Limited	200,000.00	100.00	7%	1 April and 1 October.	108 Sales.
Brett and Company, Limited	11,500.00	100.00	7%	1 June and 1 Dec.	95 Sellers.
Yokohama United Club	250,000.00	100.00	7%	30 June and 31 Dec.	108 Sales.
C. Nickel and Company, Limited	50,000.00	100.00	8%	1 May and 1 Nov.	110 Sellers.

Telegraphic Address: **"GRAND"**

Telephone (Long Distance) No. 85.

The Grand Hotel, Limited

18, 19 and 20 The Bund, Yokohama, Japan

COMMANDS AN UNBROKEN VIEW OF THE HARBOUR AND TOKYO BAY FROM BROAD TERRACES WHICH AFFORD A PLEASANT LOUNGE

Electrically Lighted Throughout — *Steam Heat and Open Fires*

Rooms Single, or En Suite with Private Bath, etc.

RATES: FROM 6 YEN UPWARD

NO EXTRAS

Wines and Cuisine (French Chef) the Best the Market Affords. The Hotel Band Plays Each Evening. A Steam Launch Under Competent Supervision Attends All Arriving and Departing Steamers, and the Porter Attends to All Customs Formalities in Respect to Baggage.

THE GRAND HOTEL CATERS TO FIRST-CLASS TRAVEL AND IS THE BEST KNOWN HOTEL IN THE EAST

Address Letters to "The Manager"

MANILA SHARE QUOTATIONS

COURTESY MESSRS. W. A. FITTON & CO., MANILA, P. I., JANUARY, 1906.

STOCK.	When Establis'd.	CAPITAL.	NO. OF SHARES.	VALUE.	PAID UP.	RESERVE.	LAST DIVIDEND AND WHEN PAID.	QUOTATION.
Banks.								
Banco Español-Filipino	1852	₱1,500,000	7,500	200.00	all	† ₱900,000	8 per cent for year ended 31st Decr. 1904	Sales @ ₱300
Yuen Sheng Exchange & Trading Co.	1904	2,000,000	10,000	200.00	100	First year		Buyers @ ₱125
Cigar Companies								
Alhambra	1898	60,000	300	200 00	all	* None	None since 1898	Sellers @ ₱165
Dos Hermanas	1905	†* 50,000	250	200.00	all	First year	First year	Nominal @ ₱200
Germinal	1899	511,817.97	720	500.00	all	₱98,878.27	4 per cent year ended 31st Dec. 1904	Sellers @ ₱600
Maria Cristina	1901	135,000	300	450.00	all	None	5 per cent for 1904; written off ₱35,000	Sellers @ ₱450
Dock.								
Varadero (Cañacao) Slip	1884	450,000	4,500	100.00	all	†† ₱271,745.03	2½ per cent for ½ year ended Sept. 30/05	Nominal @ ₱100
Shipping.								
Compañía Marítima	1897	** 1,200,000	6,000	200.00	all	** None	None. Insurance Reserve Fund of ₱46,573.89	Sellers @ ₱150
Gold Mining & Dredging.								
Eastern Mining Co.	1904	*§ $3,000,000	3,000,000	$1	"A"	None	None	Nominal
Oriental Mining Co.	do	*§ $1,500 000	1,500,000	$1	"B"	do	do	do
Philippine Mining Co.	do	*§ $3,000 000	3,000,000	$1	"C"	do	do	Sellers @ 20 cents.
Philippines Mining, Power & Development Co.	do	*§ $1,500,000	1,500,000	$1	"D"	do	do	Nominal.
Insurance.								
Yektongling Fire & Marine	1903	$2,000,000	10,000	200.00	100	₱30,000	10 % for year ended 31-12-04	Buyers @ ₱120
Sundry.								
Batan Coal Mining Co.	1902	1,000,000	5,000	200 00	all	None	None	Nominal @ ₱200
'La Concha" Button Factory	1905	75,000	750	100.00	all	None	First year	Sellers @ ₱100
Fábrica de Hielo (Ice Co.)	1886	350,000	7,000	50.00	all	₱59,224.08	Interim dividend of 8 % on 6 mos. working ended June 30 05	Sellers @ ₱85
Iron Works (San Nicolás)	1900	300,000	600	500.00	all	None	Dividend for 1903, but unpaid, ₱94,520.57 at credit of P. & L. Dec. 31 04	Sellers @ ₱200;
Montserrat Bakery Co.	1905	20,000	40	500.00	all	First year	First year	Sellers @ ₱525
Philippines Co.	1904	§ 675,000	67,500	10.00	all	None	None	Buyers @ ₱3 00

† { Reserve Fund ₱225,000. do voluntary ₱675,000.
* ₱20,226 96 carried to debit of P. & L. a/c June 30/05.
§ Hongkong Currency.
** Reduced 1905 from ₱3,000,000 to ₱1,200,000.
*§ Gold Currency.
"A" 2,115,000 shares issued.
"B" 1,200,000 ,, ,,
"C" 2,500,000 shares issued.
"D" 1,000,000 ,, ,,
†† { Reserve Fund ₱106,077.17 do. voluntary ₱165,667.86
§§ ₱14,083.03 carried to debit of new account on 2 years' working.
†* Authorized to issue ₱50,000 Preference Shares @ 8%

K. SAKUMA
Managing Director

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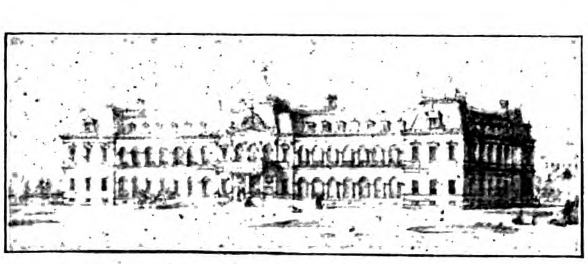

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THE FAR EASTERN REVIEW

COMMERCE ✲ ENGINEERING ✲ FINANCE

VOL. II. MANILA, P. I., SHANGHAI, AND YOKOHAMA, FEBRUARY, 1906. No. 9.

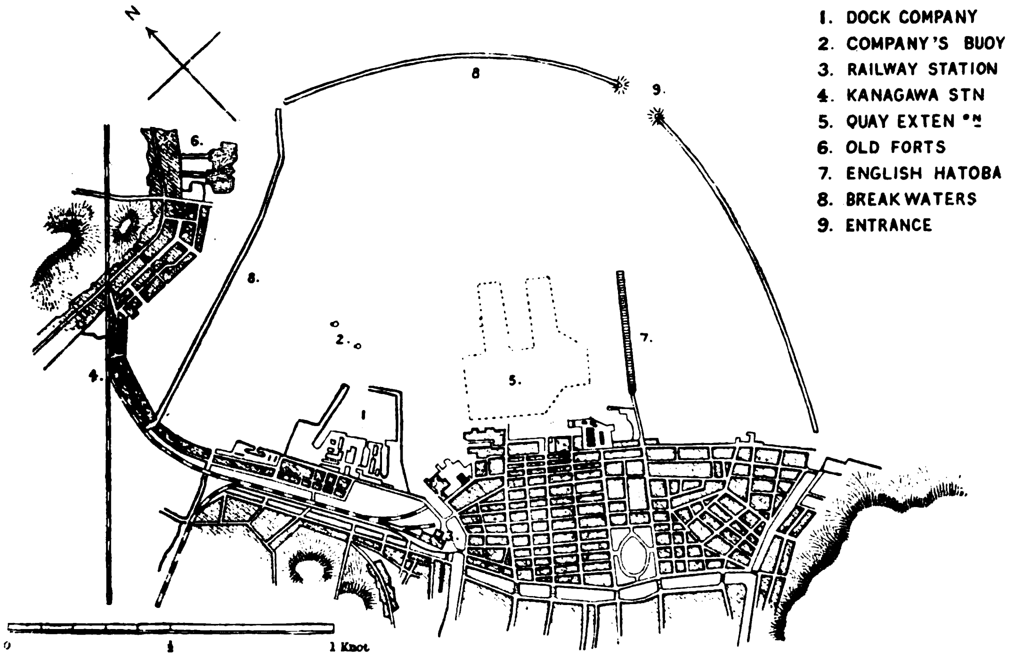
Equipment and Capacity of the Dockyards and Shipbuilding Plants of Japan—I

(By CHAS. ALBERTSON.)

The Japanese are quartered on a long, narrow, very mountainous group of islands having an area ⅓ larger than the British Isles and about equal to that of California, of which only 12 per cent is capable of cultivation. The dense population of from 45,000,000 to 50,000,000, all dependent upon the products of the field and the nearby waters, carry on their outdoor work by many an ancient method. Their struggle for existence has not been an easy one. Yet with all this they are contented and happy, for the struggle has not been characterized by the haste and intense strain under which Americans labor. In this respect they are wiser in their day and generation than the Americans are.

PROGRESS OF JAPAN.—When considering Japan's progress it is well to remember that there are at least two view-points. One is the Japanese; and if we judge by their notions, the advancement during the time occupied by the last half of Marquis Ito's public life alone is little less than marvelous. This is the point of view persistently put forward by them and often seen in the newspapers. On the other hand, from the outlook of a foreigner who has lived in Japan and knows the average as well as the exceptional conditions, they still have a long way to go in their industries and civilization to attain the eminence they are popularly given credit of having already reached.

Japan progresses. Her shipbuilding progresses also. So do her other industries. Were it possible, a hasty glance along a few other lines of Japanese industry would be of interest as showing in a general way the past and existing conditions and the present state of progress. This comparison of industrial works should give the relative progress and position of shipbuilding as compared with the improvement and present standing of other industrial enterprises. It would also emphatically evidence the fact that Japan's industrial growth has not been in shipbuilding alone, but that her progress has been along all other lines, and therefore that shipbuilding has only been keeping pace with the national progress.



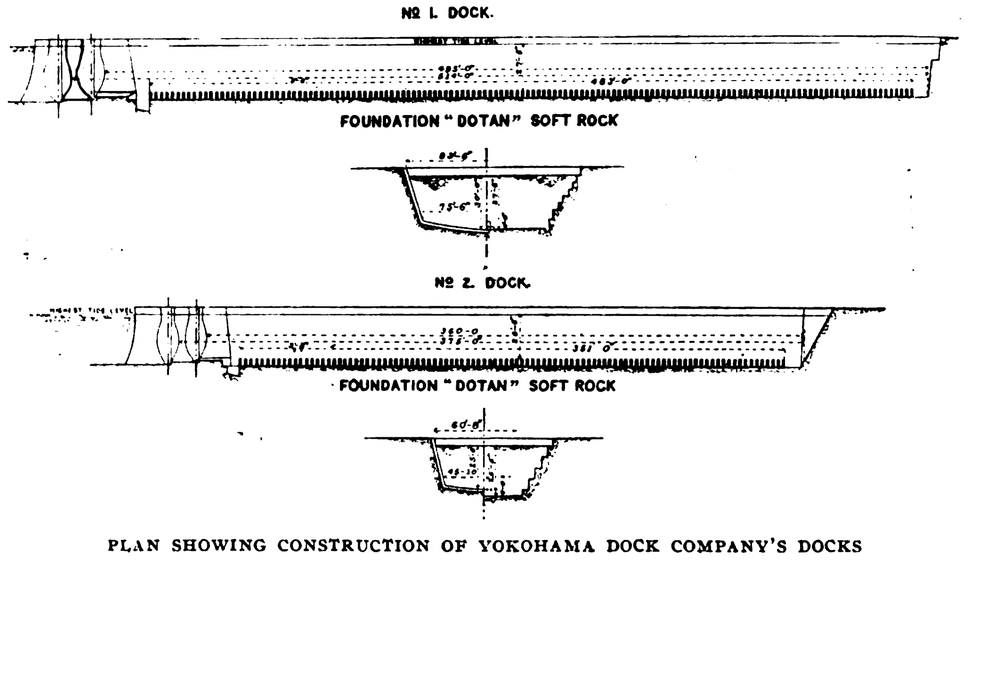
YOKOHAMA HARBOR

We may only state that in coal, copper, gold, and other mining she is using up-to-date appliances with good results. In the matter of electric street railways, her urban and inter-urban systems are well equipped and well-paying. Her steam railroads have been improved and extended, and the rolling stock and shops are in good condition. The postal system is a credit to the nation. The telegraphs and telephones are efficiently conducted at rates about half of what the free people of the United States are paying. Cotton spinning and weaving mills are successfully run. Electric-light and power plants, operated some by steam and some by water, are starting up in all advantageous places. Gas plants are being built, and the large cities are already supplied with excellent waterworks. And so on through the whole line of enterprises there is progress and success.

ADVANCEMENT IN SHIPBUILDING.—Even yet, in the matter of competition, the shipbuilding capabilities of Japan are not large enough to be of intense interest or much concern to the mighty shipbuilding nations of the earth. However, since Japan is creating an interest in herself by rapidly forging to the front and properly taking her place in the family of nations, all that directly pertains to her growth and welfare must sooner or later interest the other nations. Moreover, because of her insular and isolated position, she herself is mightily interested in and later may be more dependent upon her shipbuilding interests, both industrial and as a means of defense.

National pride is a strong Japanese characteristic, and hence while there is no es-

(Continued on page 238)



PLAN SHOWING CONSTRUCTION OF YOKOHAMA DOCK COMPANY'S DOCKS

THE FAR ESATERN REVIEW

GEO. BRONSON REA, M. E.

PUBLISHER AND EDITOR

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A MONTHLY REVIEW OF FAR EASTERN TRADE, FINANCE, AND ENGINEERING. DEDICATED TO THE INDUSTRIAL DEVELOPMENT AND ADVANCEMENT OF TRADE IN THE PHILIPPINES AND FAR EASTERN COUNTRIES.

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MANILA, SHANGHAI, AND YOKOHAMA, FEBRUARY 1906

ANNOUNCEMENT

Mr. J. F. Kennedy has retired from the business management of THE FAR EASTERN REVIEW, being succeeded temporarily in that capacity by Mr. E. E. Elser who, until the return of our Mr. Rea from America, will look after the business affairs of the paper. Mr. Kennedy leaves our Manila office after rendering efficient and faithful service, and goes to Yokohama where he will act as Japan representative of THE REVIEW in addition to his future occupation as lessee and manager of *The Japan Advertiser*, which paper he secured control of during a recent business trip to the North. While we regret the retirement of Mr Kennedy from the publication office of THE REVIEW, we are gratified that he will remain with us as our Japan representative knowing that he will serve the paper well in that field. Mr. Kennedy's office will be located at 74 C, Yokohama, where he may be found after March 1st.

ENGINEERING REPAIR WORK IN MANILA

One of the first steps of importance taken by Major-General Leonard A. Wood, U. S. Army, after he assumed command of the Philippines Division, was in the interest of the engineering firms of Manila. He issued an order that after the repair work now under way at the Quartermaster Shops is cleaned up, so much of the plant as has been doing the work that otherwise could have been done by local engineering firms, under contract, shall be closed and this patronage distributed among the latter to the best advantage of the government. This action on the part of the general indicates that his policy as commanding general of the division will be to throw all the business possible resulting from the maintenance of the military establishment in the Philippines—other conditions being equal—to the business concerns of Manila. This broad spirit of administration is only a continuation of the policy General Wood has been carrying out in the Moro Province, where his works have long ago borne the fruits of cooperation on the part of the business community and general prosperity for the people. Since General Wood assumed military and civil control of the Moro Province he has brought all interests around to feel that they are a spoke in the wheel of government and that without unanimity of purpose the province can not prosper. The result is that today the people of the Moro country all feel that they have a personal claim on the government and that they are an important unit in the industrial and commercial development of the province, and in the affairs of the government. The cultivation of this obligation of the people to the public service has been the crowning feature of General Wood's brilliant administration of "The Chosen Land of the Orient."

We believe that by the closing of the shops General Wood has taken a wise and far-sighted step. Aside from a large saving which it promises to the government, the general effect will be to restore confidence in the serious intentions of the federal government to do good when good can be done, in the business circles of Manila. We are certain that the engineering firms fully appreciate the concession General Wood has made and that they will unite in an effort to render to the military the best service at the lowest prices possible. This is what General Wood expects, and in making the experiment he is certain of the support of these concerns. The local firms are conducting their business under the disadvantages of greater expense than other engineering firms operate anywhere else in the Orient, and of a scale of wages for skilled labor that is just as high here as it is in the United States. To offset this, however, the plants of the firms are well-equipped and complete, a fact that will materially assist in keeping prices for repair work down to a normal basis of profit.

The closing of the Quartermaster Shops is bound to throw a large amount of business to the local firms and influence the government to patronize these concerns better in the future instead of bundling off all sorts of jobs, that could just as well be executed here, to other places. The result will be a large sum of money spent by the government as by rights it should be spent, thus placing it in circulation where it will do the most good for the government that spends it.

THE SHANGHAI DOCK AND ENGINEERING COMPANY, LTD.

China Coast papers bring to us the announcement of the reorganization of the well-known general engineering and shipbuilding business of Messrs. S. C. Farnham, Boyd & Co., Ltd., of Shanghai, under the name of The Shanghai Dock and Engineering Company, Ltd. The affairs of the old company are being wound up voluntarily.

Columns have been written about "internal dissensions" resulting from the management of Messrs. S. C. Farnham, Boyd & Co., and summed up it appears that the disagreements arose over the failure of the board of directors to accord to the shareholders the representation in the affairs of the company they were properly entitled to. The directors, with Mr. John Prentice as chairman and managing director, fully realized that this desire was reasonable and just, and they finally consented to meet the wishes of the shareholders, with the result as stated above. The Hongkong and Shanghai papers lay the blame of the trouble upon Mr. Twentyman, formerly the dominating spirit in the directory of Messrs. S. C. Farnham, Boyd & Co. With his retirement the atmosphere immediately cleared, and what had been a chaotic state of affairs was transformed into unity of purpose and brought about a friendly understanding between the gentlemen remaining in control and the shareholders.

The shareholders are to be congratulated upon their decision to retain Mr. Prentice as chairman of the directory and managing director of the business; also the retention of Messrs. H. von Rücker and S. Groundwater, senior members of the old directory, as members of the new board. The personnel of the new board comprises the names of gentlemen who have long been leaders in large business enterprises, and there can be no doubt but that this splendid industrial enterprise will prosper and grow under their able supervision.

JAPAN'S MARCH OF PROGRESS

Japan is striding forward again. She is fast taking her place among the maritime and industrial nations of the earth. She has known how best to build up her trade and her home production. In order to get capital to enter her gates she has just broken with one of her oldest traditions. She is allowing foreigners to buy and hold land, and she is permitting her own people to mortgage their real-estate holdings. It was not possible in the past for capital to enter Japan, for the first demand made by capital is security, and the best security on earth is the earth itself. The law permitting the Japanese to mortgage their real estate puts into their possession the possibilities of loans amounting to at least -Y-785,000,000. With such a sum mines may be opened, soil reclaimed and factories built and equipped. Mortgages may be placed now in mills, mines, railways, etc., thus materially augmenting the industrial and trading powers of the country. Everybody in the Far East is beginning to notice that Japan is growing less and less dependent upon foreign factories. She is manufacturing many goods that went into her formerly from Europe and America. Nor is this all. She has gone forward until she is able to export large quantities of goods similar to those formerly bought from others for her own children. She is gaining a strong hold on the Orient. Expressed in figures her progress is indicated by an advance from -Y-56,000,000 in 1900 to -Y-97,000,000 in 1904. We believe that if anybody is waiting for Japan to fail or fall in her efforts to augment her industrial power or to extend her trade, he will be disappointed.

TRADEMARKS IN CHINA

The question of trademarks and other protection in foreign countries is one of the highest importance to manufacturers of special lines of goods. It is especially important to those using the markets of China, where the people are strongly wedded to custom, and where limited knowledge of progressive methods of the outside world makes them suspicious of everything that is new, regardless of any merit that may be presented.

The Chinese law affords no protection to foreign *chops*, or trademarks, a condition that

has frequently led to serious complications in the transaction of business. Trademarks of goo ls, popular on the China market, have been closely imitated, and a cheaper and inferior quality has been substituted and disposed of under a spurious mark. This has led to a concentrated effort on the part of foreign government representatives in China to have the Chinese Government promulgate regulations which will minimize this abuse. Under present conditions the merchant in Shanghai representing foreign manufacturers files the trademark with his consular representative, and it is then transmitted to the custom house, where it is recorded by number. The only advantage accruing to the business man under this arrangement is that in the event of trademark regulations going into effect he may claim priority and prevent a similar mark, subsequently filed, from being used in China. This is the only object of the transaction, for the Chinese Government at present expressly disclaims any legal protection whatsoever to the foreigner against a counterfeit of his particular trademark. Should such a law go into effect the Chinese Government could only aid a foreign merchant to the extent of preventing native dealers from selling goods masquerading under a counterfeit trademark. If the *chop* of a foreign manufacturer should be imitated by any other foreigner (and these instances have not been uncommon in China), his only remedy lies in prosecution through his consular representative.

The Peking Government, in 1904, formulated and submitted to representatives of foreign governments provisional regulations governing the registration of trademarks. They were to become effective October 23d, 1904. The provisions were unsatisfactory, however, and the American, British, and German associations of Shanghai submitted amendments which were forwarded to the ministers at Peking. They in turn amended the amended draft and submitted it to the Chinese Foreign Office, which referred it to the Chinese Board of Commerce, which now has it under consideration. While the foreign merchants are thankful that this highly important question is now before the official determining body, they do not anticipate relief in the near future, and are adopting universally the unsatisfactory but only means of protection afforded, through the filing of trademarks for record with the Chinese customs officials.

RECENT OFFICIAL PROMOTIONS

Great merit has been rewarded in the elevation of His Excellency Henry C. Ide to the office of Governor-General of the Philippine Islands, *vice* the Hon. Luke E. Wright, appointed by President Roosevelt first American ambassador to the Government of Japan. While we consider the retirement of Governor-General Wright a distinct loss to American interests in the Philippines, we are able to find abundant consolation in the fact that for a period——which we hope will be longer than it promises to be at the present time——the reins of government will be held by Judge Ide. The new governor-general is a tried and true official. He has been a moving spirit in official life here ever since the Taft commission took over the civil government, and as Secretary of Finance and Justice he has surmounted probably the most difficult economic problems that have arisen since American occupation. It is needless for us to dwell upon the record of this estimable gentleman, because it is so well known and has been given such wide publicity that it would have little effect here. Suffice it to say that Governor-General Ide is an ideal official, possesses all the qualifications required for a safe and sane administration of our insular affairs in the Philippines, and that he will prove a very popular governor-general with not only the American colony, but with the foreign residents as well. Commissioner James F. Smith, Secretary of Education, has succeeded to the position of vice governor-general vacated by the promotion of Judge Ide. He, too, is a veteran in the public service of the Philippines, and a conscientious servant of the people. We are gratified to note that, with the retirement of Governor-General Ide, General Smith will be elevated to the highest civil office of the Islands.

RAILROAD CONSTRUCTION IN THE PHILIPPINES

The long-hoped-for era of railroad construction is about to begin in the Philippine Islands. Complying with directions from the Secretary of War at Washington, the Philippine Commission has awarded to the contracting and engineering firm of Messrs. J. G. White & Co., Inc., of New York City and Manila, concessionary grants for the construction, maintenance and operation of the projected railroad systems on the Islands of Panay, Negros, and Cebu.

Following the formal award of the contract, Mr. H. A. Belden, general manager for Messrs. J. G. White & Co., in the Philippines, received instructions from his home office to proceed immediately with the survey of the islands in question, with the result that he will soon have field parties of civil engineers at this work. On Panay 100 ms. of line will be constructed, on Negros 100 ms, and on Cebu 95 ms. The terminals, routes, and branch lines can not be definitely indicated until the completion of the surveys, although it is understood that Iloilo will be headquarters of construction on the Island of Panay, and the town of Cebu on the Island of Cebu.

Late information from New York City throws some additional light on the interests behind Messrs. J. G. White & Co. in this big undertaking. Messrs. Kean, Van Cortlandt & Co., of New York City; Mr. Charles M. Swift, president of the Manila Electric Railroad and Light Company; Mr. Cornelius Vanderbilt, and Messrs. R. T. Wilson & Co., of New York City, and the International Banking Corporation, were associated with the grantee firm in the bidding, and will share the financial outlay for the construction of the lines. The combined capital of the syndicate amounts to many millions of dollars, so there will be no lack of funds to push the railroads to completion, equip them, and put them in operation.

There was no competition for the concessions in N. Luzon nor on the islands where Messrs. J. G. White & Co. are to operate. Messrs. Morris McMicken, G. Gresskens, G. Poncin, Jacob Furth, and E. C. Hughes, of Seattle, Wash., offered to build 100 ms. of line in S. Luzon, and complete the road in 3 yrs. instead of 1 yr., as required by the government, but when a second set of bids was called for this syndicate failed to respond. Messrs. Speyer & Co., bankers of 21 Pine st, New York City, and London, have offered to construct 425 ms. of line in Luzon without guarantee, in connection with the Manila and Dagupan system of the Manila Railway Company, Ltd., which they control. The bid of the Seattle contractors was for the proposed line in S. Luzon from Pasacao to Legaspi, with branches. This line was also included in the bid of Messrs. Speyer & Co., the former asking for a guarantee and the latter none. Messrs. Speyer & Co. want concessions to build branches of the existing Manila and Dagupan system, also; and it is said that if their bid is accepted it probably will result finally in the operation under one management of 633 ms. of railroad on Luzon. The firm's bid was for the line from Manila to Batangas and branches to Santa Cruz and to Lucena, the line from Dagupan to San Fernando and the line from Pasacao to Legaspi, with branches. There has been much speculation in Manila why the Secretary of War is holding back the government's decision on Messrs. Speyer & Co.'s bid. The Manila Railway Company, Ltd., has a large claim against the Washington Government for alleged damages to its lines, equipment and other property, during the Filipino insurrection, which is now being pressed with much vigor at Washington, and it is surmised in official circles here that on account of this the federal authorities intend to make searching inquiry into all features of the claim and its future influence over Messrs. Speyer & Co., before finally determining the question of letting them in on the new enterprises.

The invasion of Messrs. J. G. White & Co. into the railroad construction field of the Orient marks the first instance in the history of the United States where a strictly all-American syndicate has come into actual contact with railway construction problems of the Far East. For this reason the progress of building, which will be conducted along American lines, will be watched out here with great interest. Knowing as well as we do the ability of Messrs. J. G. White & Co. to handle large undertakings like this with ease and despatch, we have no hesitancy to predict that railway construction under their direction will develop many surprising features which other engineers of the Orient will be called upon by the dictates of their profession to study with interest. While the contractors hope to carry out the construction with native labor they will be prepared to draw upon Japan for workmen should the Filipinos fail to respond freely to the call for workmen.

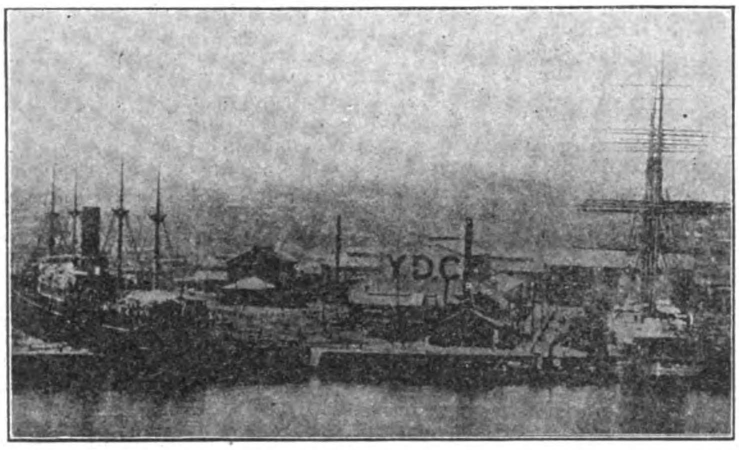
ELECTRIC URBAN FREIGHT SERVICE

Since the Philippine Commission has granted a franchise (or license) to the Manila Electric Railroad and Light Company to extend its system over certain streets in the city, for the purpose of hauling freight from the Trozo District station of the Manila and Dagupan Railway to the projected new harbor piers, it may be interesting to know that this kind of transportation is already in successful operation in Singapore. There freight trains are drawn by a *bogie* motor van which serves both as a baggage van and locomotive. The van is mounted on a Brill truck of the type described as *27 G*, and it is equipped with electric motors and controllers of the Dick-Kerr type, which were manufactured at Preston, England, by Messrs. Dick, Kerr & Co., who were the contractors for the entire equipment of the Singapore lines, consisting of 26½ ms. of track. The motors are of the 4-pole type, and are suspended on bearings 4" in diameter. They are designed to work at a pressure of 500 volts, and are capable of giving 25 b. h. p. at 570 r. p. m. for 1 hr. without raise in temperature above 110° Fahr. The motor van, besides the baggage compartment, has a platform at each end, provided as a canopy as a protection for the motormen.

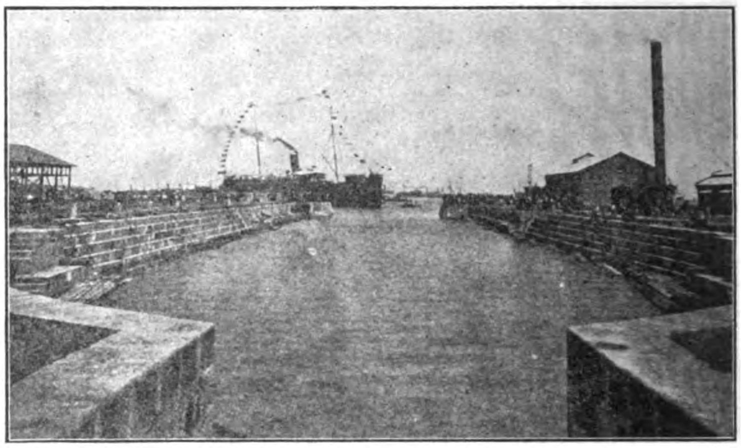
There are fifteen freight cars, 12′ 6″ in length, and 6′ 6″ wide. These cars are intended for loads up to 6 tons. The frame is made of mild steel channels, stayed by longitudinal stays, braces, and gusset plates. The sides of the cars are hinged, and can be let down for convenience in loading and unloading. In order to protect the freight from the weather each car is supplied with a detachable light angle frame, upon which a tarpaulin is spread for the entire length of the car, at a height of 7 ft. from the flooring.

Altogether the Singapore installation compares very favorably with any of the electric light railways in England and the engineers and contractors have provided some novelties.

An interesting feature in the construction of the Singapore lines was the use of the thermit joint, by which all rails were joined to make a continuous length. Considerable discussion took place on the initiation of the scheme as to the desirability of having continuous rails, it being thought by some that the variation in temperature would prejudicially affect the joints. Experience elsewhere appeared conclusive, however, and the thermit system was eventually adopted. The promoters of the undertaking are the Association General, Ltd., and the India Construction Syndicate, Ltd., of London, and the engineers were Messrs. Alfred Dickenson & Co., of Birmingham, who were engineers for the construction of similar lines in Barcelona, Madrid, and Capetown.



YOKOHAMA DOCK COMPANY, LTD.—GENERAL VIEW OF WORKS AND DOCKS



YOKOHAMA DOCK COMPANY, LTD.—VIEW OF FIRST SHIP, SAIKIO-MARU, ENTERING NO. 2 DOCK, 1897

EQUIPMENT AND CAPACITY OF THE DOCKYARDS AND SHIPBUILDING PLANTS OF JAPAN

(Continued from page 235.)

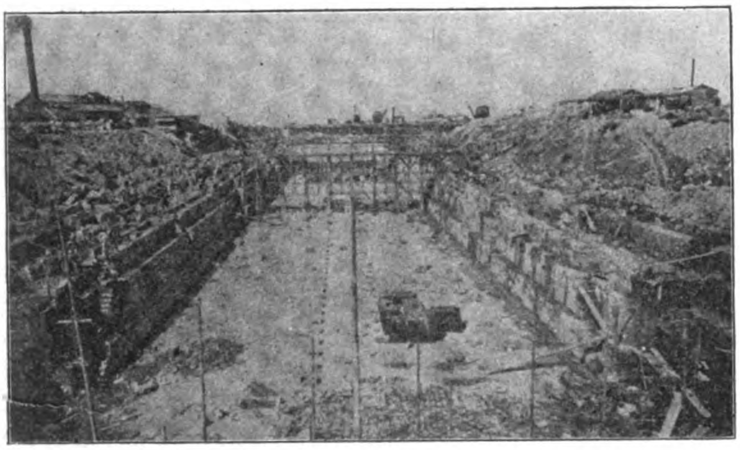
pecial antagonism against the foreigner the Japanese earnestly desire to get all industries in their own hands and then be independent. This desire will be a long while in seeing its fulfillment, for we are none of us independent.

Rear-Admiral Sasao, Director of the Naval Construction Corps, said in an address 2 yrs. ago:—"It is, perhaps, hardly necessary to point out how important it becomes to promote our industries connected with shipbuilding, in order that we may drive out foreign-made goods altogether from ships built in this country." A Japanese engineering journal voices the same sentiment.

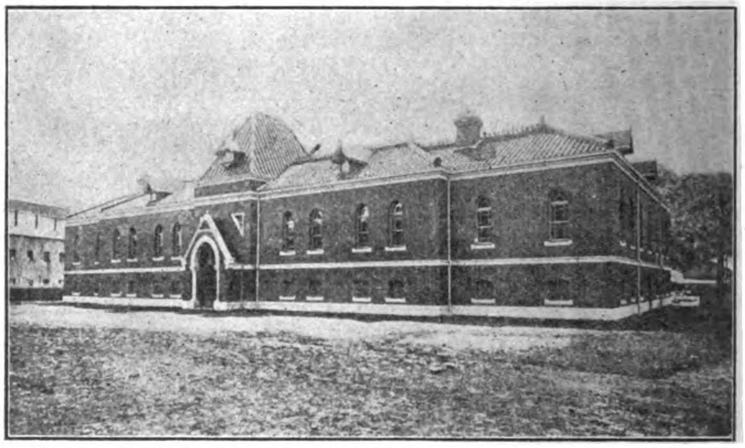
It is well to keep continually in mind the fact that the Japanese have done but little or nothing to add to the science of ship or engine building. Other nations have learned nothing new from her along these lines, yet this should not detract from the credit due to Japan on account of her splendid advancement. Her problem is the adaptation of the present knowledge of other peoples to her own use, and the training of men to use this knowledge for her benefit. This in itself is a large undertaking, but the results show strikingly how well it has been accomplished. She did not start with the old-fashioned paddle-wheel steamer and its primitive machinery, but leaped at once from the wooden junk to single and twin-screw steamers with compound and triple-expansion engines. She has been compelled to develop men rather than machinery. Even with the advantage of starting way up the ladder of science, she still has many, many rungs to climb in order to reach the height attained by other nations. That she is climbing, and climbing well, everyone admits.

It is a curious fact, worthy of note, that Japanese thought and language contain absolutely nothing in the way of words, or parts of words that could be pieced together, to express modern shipbuilding and marine terms. They have therefore borrowed outright most of the English technical terms, and use them, although at the Mitsu Bishi Works a few old Dutch words linger in use. Even on shipboard a Japanese captain gives his commands in English. All this helps to show how very new and strange shipbuilding and its component industries were to the Japanese.

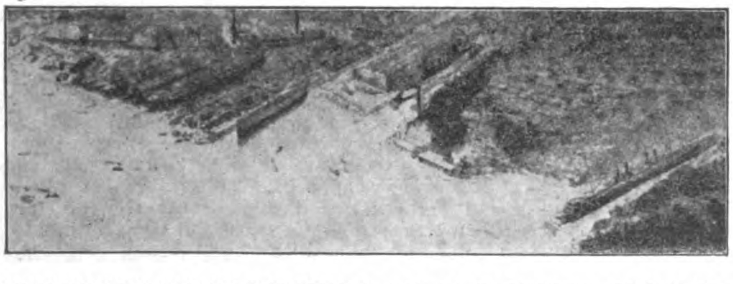
ACTIVITY IN A JAPANESE SHIPYARD.—If one could be dropped unawares into a modern Japanese shipyard, with eyes blindfolded and the peculiar sounds of the Japanese language kept from the ears, the sensation produced would be exactly similar to stepping into an English or American shipyard, for the clatter of pneumatic caulkers, riveters, and chippers, the rattle of plates, the grinding of punching and shearing machines, the thud and jar of steam hammers, the whir of motors, the crunch-



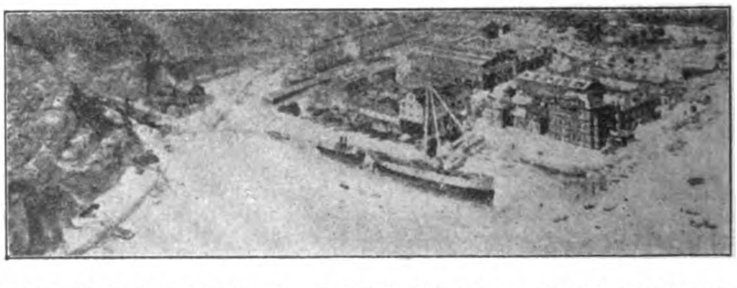
YOKOHAMA DOCK COMPANY, LTD.—VIEW OF LARGE DOCK IN COURSE OF CONSTRUCTION. TYPICAL JAPANESE DRYDOCK CONSTRUCTION



SCHOOL AT BITSU BISHI DOCKYARD AND ENGINE WORKS



MITSU BISHI DOCKYARD AND ENGINE WORKS—HALF VIEW, COMPLETED IN OPPOSITE ILLUSTRATION



MITSU BISHI DOCKYARD AND ENGINE WORKS—COMPLETED FROM OPPOSITE ILLUSTRATION

ing of hydraulic machines, and the rattle and rumble of hammers and machine tools generally, all conspire to give one the same feeling of progress and activity in the various departments that would be experienced in Great Britain and America. The appliances are the same, the result is the same; but the work is being done by a different nationality—one that is strictly Oriental, but nevertheless one that is versatile enough to take up the best that all nations have to offer.

About 300 yrs. ago, Japan was one of the most progressive, vigorous, and powerful of all the maritime and shipbuilding nations of the Far East. So apt were her seafaring people at designing and building the then great ships that she developed a fleet of fast 3-masted junks which out-sailed the ships of China, Korea, and all other eastern nations. This superiority in the matter of speed, besides building up a great sea trade, soon produced a class of pirates who plundered everything upon the high seas. Complaint after complaint reached the ruling *shogun* at Yedo. For this and other reasons an edict was finally issued forbidding the building of junks, having more than one mast. From that time even to the present day, many of these picturesque, though awkward, 100-ton junks sail the island-dotted waters of Japan. A later law giving full freedom to shipbuilding favors a type of foreign schooner rig, and soon the big, single square sail will be seen no more.

Under a wiser *régime*, Japan's summarily arrested development has taken on a new start and a new form, for today she builds in steel and sails with steam. It is no news that Japan is making a mark in the great world, and to shipbuilders and associated industries it will doubtless be of interest to know what may be expected of the *Little Sea Realm* in an industry upon which she is so dependent. England goes surely and steadily onward in the yearly construction of vast maritime fleets and great navies of peace-keepers. Germany has startled the marine world by her strides in the same direction, and lately the United States has surprised the globe with the work of her new and old shipyards, particularly as evidenced in the small but excellent home-built navy.

General Survey of Ships and Shipping.—It will be the purpose of this review to show exactly and accurately what Japan has been and is doing, and how well she is doing it; the difficulties under which she labors industrially, and her dependence on other countries for material. Then a reasonably correct forecast of the future may be made. A complete description of yards, their equipment, output, management, and labor conditions, together with a statement showing how the demand arises for repairs and ships, will therefore be pertinent and necessary to the subject.

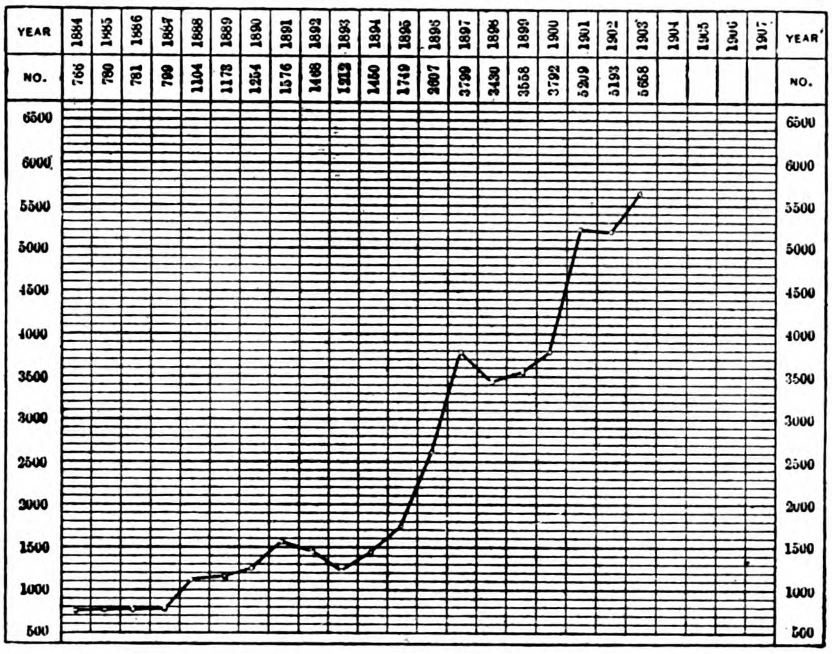


DIAGRAM ILLUSTRATING NUMBER OF WORKMEN EMPLOYED IN SHIPBUILDING 1884-1903 INCLUSIVE IN JAPAN

A general survey of Japan's ships and shipping shows that in 1870 the Japanese owned about 17,000 tons. Before the war with China there were under the Japanese flag a total of 225,000 gross tons. At this time the Japanese mercantile marine carried about 1/10 of the total exports of the empire. At the end of 1903, the number of vessels above 20 tons registered in Japan was 1,088 steamers, having a gross tonnage of 657,269, and 3,514 sailing vessels, mostly junks, with a gross tonnage of 322,154; or, in all, 4,602 vessels having a gross tonnage of 979,423. These figures include foreign-built as well as Japanese-built steamers, for in order to carry the Japanese flag they must belong to the Japanese.

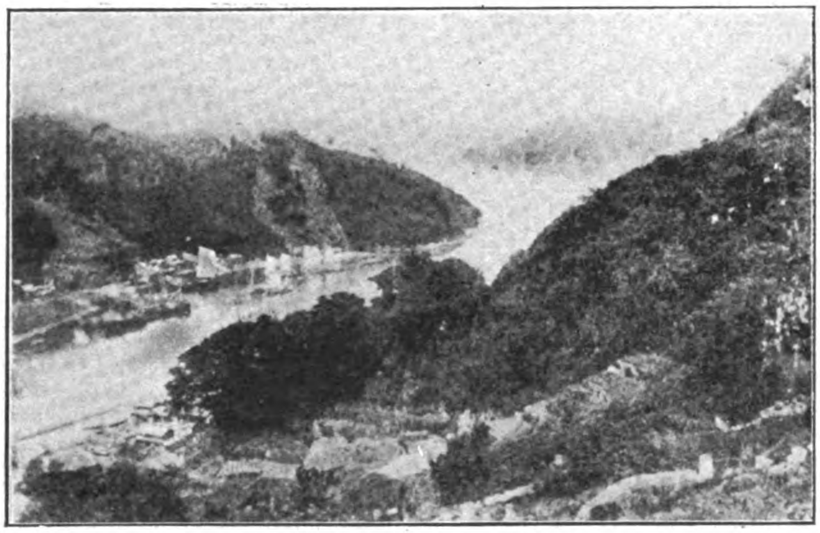
In 1902, 23,000,000 tons of shipping entered and cleared at Japanese ports, of which more than 1/3 was under the Japanese flag.

For 10 yrs. ending 1903, the average tonnage of Japan's steamers increased from 180 to 650 tons. Since the shipbuilding subsidy act of 1896 there have been built in Japan about 40 steamers qualified to receive the subsidy benefits. These range in size from 713 tons to 6,444 tons, gross, making a total of, roughly, 100,000 tons, having a total of about 83,000 indicated h. p. The speeds vary from 10 to 15 1/3 knots.

In 1893 Japan built 26 steamers totalling 4,000 gross tons and bought 10 steamers totalling 13,000 gross tons. In 1903 she built 65 steamers of 33,600 gross tons, and bought 17 steamers of 33,400 gross tons. It will thus be seen that during this period there has been a decided increase in both the number and tonnage of ships built at home, while the purchase of ships as compared with those home-built is gradually decreasing.

Shipbuilding materials are imported from England, America, and Germany principally. Contracts for delivering these articles at the

YOKOHAMA DOCK COMPANY, LTD.—BARQUE *ASTERISK* IN NO. 2 DOCK, 374 FT. LONG



SMALL JAPANESE SHIPYARD, BUILDING SAMPANS AND JUNKS. SITUATION TYPICAL OF MUCH OF THE COAST OF JAPAN

shipyards are awarded, after tender, to various Japanese and foreign importing firms who buy through their home offices. The Mitsu Bishi Company, however, purchases mostly through a representative in England who buys its supplies on a small commission.

With the exception of possibly some small lathes and other minor tools for use in the little yards, Japan still imports all her ship and engine-building, dockyard, and repairing equipment. It does not take long to state this, but it is worth some attention.

From pig iron to unfinished teak, from stempost to sternpost, at least 90 per cent of the material for building ships in the Japanese yards is imported. This is also worth some attention. Some of this, of course, arrives in the raw and is finished or made up at the yards; but many smaller items, such as deck machinery, pumps, fittings, etc., are imported complete. To order and deliver these supplies takes time, so that short delivery after placing a contract is impossible. All this, with labor cheap in price but not altogether efficient, show that Japan is not the best favored nation in the world in regard to shipbuilding. Builders and owners must therefore depend on the assistance of subsidies for a long time to come.

If she has a good supply of iron ore—which she has not—there would be then some hope of changing the present unfavorable conditions. One opportunity for improvement lies in increasing the efficiency of her labor without any undue increase in wages.

Longing for industrial independence, and also to meet the home demand for plates, shapes and rails, the government has established a steel plant at Yawatamachi, near the W. entrance to the Inland Sea, capable of turning out 80,000 tons per yr. The works import the nearest iron ore from China, and as Japanese coal is not "A-1" for coking purposes they can not be operated under the most favorable conditions. At the first the output was not satisfactory, and even today the builders prefer, for quality, an imported plate with Lloyd's test to one made in the only homeworks.

In 1893 there were in Japan about 60 shipbuilding yards. In 1903 this number had increased to 185. It must be borne in mind, however, that every place capable of building an ordinary junk is included in this number, and that the shipbuilding yards which are really of moment to the foreigner can be counted on the fingers of one hand.

Descriptions, some general and some in detail will be given of enough of the private shipbuilding and drydock establishments to show the general character of all of them. Those of most interest include the Mitsu Bishi Dockyard and Engine Works, Nagasaki; the Kawasaki Dockyard Company, Ltd., Kobé; the Yokohama Dock Company, Ltd, Yokohama; the Ishikawajima Shipbuilding and Engineering Company, Ltd., Tokyo and Uraga; Osaka Iron Works, Osaka; Hakodate Drydock Company, Hakodate, Hokkido; the Bingo Drydock Company, Province of Bingo, and the Innoshima Dockyard Company, Province of Bingo.

Other than the largest companies mentioned above, there are five which own docks more than 250′ in length, and three owning docks more than 200′ in length.

GOVERNMENT SHIP AND DOCKYARDS.—Of the imperial government naval dockyards only a few bare facts dare, with propriety, be given. These yards are four in number. One is at Yokosuko, nicely located inside the entrance of Tokyo Bay, and has three good drydocks. Here can be easily docked the largest battleship afloat. Among the warships constructed here may be mentioned the four largest, *viz.*, *Hashidate*, an unarmored cruiser, 301′×51′×20′, of 4,200 tons displacement, a designed h. p. of 5,300, and a speed of 16 knots, which was launched in 1891; *Akitsushima*, an unarmored cruiser, 300′×43′×17′6″, of 3,000-tons displacement, a designed h. p. of 8,400, and a speed of 19 knots, was launched in 1892; *Nietaka*, a 3d-class unarmored cruiser, 335′×44′×76′, of 3,366-tons displacement, a designed h. p. of 9,400, and a speed of 20 knots, was launched in 1902; *Otawa*, a 3d-class unarmored cruiser, 321′6″×41′3″×15′9″, of 3,000-tons displacement, a designated h. p. of 10,000 and a speed of 21 knots, was launched in November, 1903.

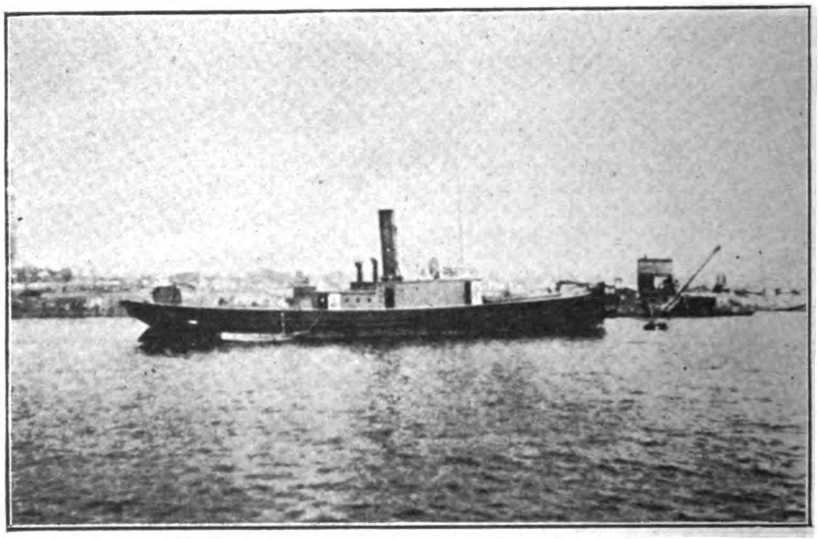
Leaving out torpedo-boats and torpedo-boat destroyers, these vessels constitute half the total tonnage of warships turned out in all Japan, and comprise ⅔ of Yokosuka's tonnage. They are also the largest ever built by the government in the island empire. This shows clearly how small a part of the Imperial Japanese Navy is built at home, since official records show that Japan has between 45 and 50 warships of over 1,000-tons displacement, approximating in all 250,000 tons.

Another of the naval yards is at Kure, hidden safely away among the islands on the N. shore of the Inland Sea. Here are two drydocks and here was docked the American battleship *Oregon* when the Russians claimed that the Port Arthur dock was too small.

In 1903 *Tsushima*, a 3d-class unarmored cruiser, 334′9″×44′×16′3″, of 3,400-tons displacement, a designed h.p. of 9,400, and a speed of 20 knots, was launched here. The recent exhibition in Osaka had on view a 10″ gun made at Kure, as well as a full line of smaller arms and a very complete set of steel castings. These were the work of the arsenal department. Armor plate has not as yet been manufactured in Japan, but appropriations have been made for a complete armor-plate plant to be installed in the Kure yards.

Sasabo is another, though considerably smaller, naval yard, located at the end of a long, narrow bay on the SW. coast of Japan. Here there is one large drydock.

Maizuru is the newest of the yards, and is situated on the N. of Japan Sea side of the empire. Here, too, there is a splendid dock.



YOKOHAMA DOCK COMPANY, LTD.—TWIN SCREW TUG *TOBE-MARU;* 100 FT. LONG, 300 I. H. P.

All of these yards are so located and fortified that it would be almost impossible for a foreign navy to get anywhere within range of them. The Japanese, to a greater or less degree, build torpedoboats and destroyers, o which they have added many to their navy

The preparedness and excellent condition of the Imperial Japanese Navy in its recent battles prove conclusively that these yards are well equipped and mighty efficient. A following article will give a comprehensive idea of the private shipbuilding plants, concerning the plans and equipment of which fuller details may be presented than is possible in the case of the government installations.

(To be continued.)

NAVAL COALING STATION, SUBIG, P. I.

The decision of the United States Government to maintain a naval station in the Far East has taken concrete form, and work will shortly be started by Messrs. J. G. White & Co. (Inc.), of New York City and Manila, who have been awarded a contract for the construction of a naval coaling station, complete, with equipment, at Olongapo on Subig Bay, P. I.

The present installation will constitute one unit of six which will ultimately be built, providing a coal storage of 120,000 tons for the use of the United States Navy. The initial unit will cost approximately $500,000 gold, and will require 2 yrs. to complete.

Subig Bay, about 75 ms. N. of Manila, is one of the finest harbors in the Orient. It was originally intended to establish a naval base at Cavite, but the board of army and navy officers decided in favor of Subig Bay in preference to both Cavite and Guam. The harbor will be heavily fortified and it is estimated that it will require an expenditure of between $10,000,000 and $15,000,000 to carry out the work proposed. A large part of the bay will be dredged to a depth of 35′, this being sufficient for the largest battleship in the navy.

The coaling plant will consist of apparatus for unloading coal from vessels or cars, and storing same, together with means for reclaiming the coal from storage and delivering it to vessels or cars again. A large water-storage tank having a capacity of 50,000 galls. will be located on top of a nearby hill and a pumping plant provided, to supply it with water from the Benictigan River, about 1½ ms. from the station. This water will be used for fire purposes in connection with the coaling station, or for the use of vessels.

The coaling unit about to be installed will be built upon a wharf 250′ long and 75′ wide. This wharf will be set upon clusters of piles which will be inclosed in concrete, thus protecting them from the action of the torredo. The dock of the wharf is of steel and concrete. From the outer edge of the wharf a steel and concrete coal bunker will be erected, having a capacity of 5 tons of coal per running ft. It will be provided with chutes for delivering coal upon the deck of vessels or into cars. An electrically-operated movable coal-unloading tower, constructed of steel, will be operated on a track extending along the top of the coal bunker. It is designed to take coal from cars on the landward side of the wharf or from colliers on the seaward side, and delivering this coal either into the bunker or upon a conveyor which will carry it to the coal-storage building. The conveyors will have a capacity of from 100 to 150 tons of coal per hr. The coal storage shed will be a steel structure with a concrete floor 450′×150′, and will hold approximately 15,000 tons. The enclosure will be divided by concrete partition walls, so that the greatest amount of coal in one pocket will be 600 tons, thus preventing the spread of fire which is liable to occur spontaneously where large masses of bituminous coal are stored.

Electric thermostats will be located at 20′ intervals, and will ring an alarm in the office of the superintendent should the temperature of the coal rise above a fixed point. All of the conveyors and other apparatus for handling the coal will be electrically operated, and a power-house of ample capacity will be installed adjacent to the coal storage building.

This unit, as described, will be supplemented from time to time by other units of similar size and type, the wharves extending continuously along the bayfront. Each wharf will accommodate a battleship, which can be coaled, to the extent of 2,000 tons, in less than half a day.

All of the coal used will be brought from the Virginia coalfields in tramp steamers, *via* the Suez Canal. The cost is practically $8 gold per ton at Subig Bay, as against $5 for Japanese coal and $5.50 for Australian coal. The American coal is, however, of a considerable higher grade and better adapted for use under marine boilers.

In conjunction with the coal station, extensive marine and repair shops will be built, in which repairs of any kind can be carried out, and small cruisers and gunboats entirely reconstructed.

Large floating docks will also be built to accommodate the largest vessels in the American Navy.

MANILA'S FINANCES, FISCAL YEAR ENDED JUNE 30th, 1905

The annual report of the Municipal Board of the City of Manila, P. I., for the fiscal yr. ended June 30th, 1905, just made public, shows the financial status of the municipality during that period.

The effect of the Internal-Revenue Law on the finances of the city, anticipated in the previous annual report, was fully realized. This, taken in connection with the decrease in the amount collected for land taxes, on account of the fact that during the previous yr. collections were made covering 18 mos., caused a reduction in revenues of nearly 25 per cent, which was about equally divided between the effects of the Internal-Revenue Law and the decrease in land-tax collections.

This reduction in revenues caused an apparent deficit at the close of the fiscal yr. 1905 of ₱22,266.25, which, however, is more than covered by the refund to the general revenue due on account of the expenditures made from the general funds for the preliminary work on the new water and sewer systems, which totals ₱359,889.13, which, it is expected, will be refunded from the resources of the bond issue.

The revenues estimated in the previous annual report were not realized by about ₱400,000, due to overestimate of land tax ₱188,000, and the fact that payments expected were delinquent by ₱104,000; reductions in collections of certificates of registration, ₱20,000; matadero fees ₱5,000; licences, ₱60,000; municipal court fines, ₱65,000; vehicle tax ₱30,000; while the estimate was exceeded in the collection of market fees, ₱5,000; pail system, ₱32,000; industrial tax, ₱24,000; water system ₱11,000.

The total revenues from collections were ₱2,937,474.83 and the grand total of expenditures ₱5,129,490.76. Following is a statement of the condition of the city finances June 30th, 1905:—

Balance from fiscal yr. 1904		₱610,497.45
Total revenues collected fiscal yr. 1905		2,937,474.83
30 percent of city's expenses paid by insular government	₱1,530,102 23	
Expenses of collection of internal revenue from January 1st to June 30th Act No. 1189)	29,150.00	
Total paid by insular government		1,559,252.23
Total credits		5,107,224.51
Total expenditures during fiscal yr. 1905		5,129,490.76
Deficit June 30th, 1905		22,266.25

The total revenues for the yr. show a decrease of ₱967,658.59, or about 25 per cent less than for the previous yr., the decrease being due mainly to reduced land-tax collections and the effect of the Internal-Revenue Law. Other decreases in collections appear in the matadero fees, due to competition of Australian meats in the public markets, thus causing a reduction in the number of animals slaughtered in the matadero; a reduction in the municipal court fines, caused by the reduction in average fines imposed and the number of fines; a reduction in the vehicle taxes, caused by the abolition of the tax at the beginning of the yr. These reductions, however, are offset by the increase in market fees, due to increased number of markets; increase in the collection of the pail system and the cleaning of vaults, due to increased business done; increase in the water receipts on account of increased number of installations, and increased cemetery fees on account of the opening of Cementerio del Norte.

The actual revenue from taxation was ₱1,698,463 07, which, on a basis of population of 219,941, equals a *per capita* tax for municipal purposes of ₱7.72.

The total expenditures during the yr. were less than those of the previous yr. by ₱16,328.66. Of these expenditures ₱92,595.21 are applicable to the fiscal yr. 1904, leaving the actual expenses for the yr. ₱5,036,895.54, which may be segregated into current expenses amounting to ₱4,231,091.82 and nonrecurrent expenses amounting to ₱805,803.73. Of the current expenses ₱3,037,714.55, or about 71.8 per cent, were expended for salaries and wages, being an increase of the ratio of salaries and wages to total expenses over the yr. previous of about 2 per cent, due to the increased pay of members of the police and fire departments.

It is estimated that the revenues for the fiscal yr. 1906 will be ₱3,146,500. It was hoped that the expenditures might be so reduced under the heading of "Public Works" that the deficit at the close of the last fiscal yr. could be fully made up, but, owing to the large sums necessary for the reconstruction of the Pasig River wall (₱336,000) and the new Ayala Bridge (₱100,000), it was found impossible without a material reduction in the current expenses of the city. The ordinary current expenses recommended for the yr are ₱4,042,570, a decrease of ₱188,521.82 from the current expenses of the last fiscal yr. In addition to all other expenses the city will be called upon to pay interest and sinking fund of ₱118,740 on the first issue of sewer and waterworks construction bonds. In this connection the board again invites attention to the recommendations in its previous annual report regarding the bond issue of ₱4,000,000 for permanent public improvements, which, if available during the next 4 yrs., would relieve the necessity of reducing the current expenses by relieving the general funds from large expenditures for public works.

The grand total of extraordinary expenses for the fiscal yr. 1906 is ₱1,039,830. Following is a statement of the prospective condition of the city's finances at the close of the current fiscal yr.:—

GENERAL FUNDS.

Estimate of revenues from collections		₱3,146,500.00
Refund of moneys expended account sewer and water-works construction		359,889.13
30 per cent expenses to be paid by insular government		1,592,102 00
Total credits		5,098,491.13

ESTIMATED EXPENDITURES.

Ordinary	₱4,042,570.00	
Extraordinary	1,298,570.00	
Deficit fiscal yr. 1905	22,266.25	
Total debits		5,363.406.25
Deficit July 1st, 1906		264,915.12

Total expenses, ₱5,341,140, of which ₱33,800, tax refunds, to be paid wholly by city.

WATER AND SEWER CONSTRUCTION BOND-ISSUE FUNDS.

Sale of $1,000,000, gold, bonds, at $1.095625, at two for one	₱2,191,250.00
Estimated interest on deposits	60,000.00
Total credits	2,251,250.00
Estimated expenditures	670,000.00
Balance July 1st, 1906	1,581,250.00

While the above statement shows a deficit, it is hoped by careful economy that this deficit may be considerably reduced before the end of the fiscal yr. This will be especially true if the assistance of the reorganization committee is obtained, which has been requested by the board in order to point out, if possible, economies that may be effected without detriment to the service.

The city has for the first time since its organization under the Charter of Manila the following liabilities.

LIABILITIES

Water and sewer construction bonds, issued June 1st, 1905, 30 yrs. 4 per cent, Act No. 1323, Philippine Commission		₱2,000,000.00
Purchase of land transportation from insular government:		
Debit—		
April 1st, 1905, inventory of equipment and animals	₱120,000.00	
Supplies at 85 per cent of value and buildings at 85 per cent of cost	125,062.00	
		245,062.00
Credit—		
Amount received from bureaus of insular government for transportation furnished—		
April	₱6,702 40	
May	12,550.31	
June account (estimated)	8,300 00	
		27.552.71
Transportation liabilities		217,509.29
Total liabilities		2,217,509,29

The Largest Hydroelectric Installation in Southern Asia, Mysore Province, India—I

(By A. C. HOBBLE.)

The first installed plant of the Cauvery power scheme, located in the Province of Mysore Southern India, has been in successful operation 3 yrs. In December of 1904 was completed the second installation, or extension, of 3,610 kws. Power is transmitted at a pressure of kws. generator capacity; thus increasing the possible output of the plant to 7,920 kws. Power is transmitted at a pressure of 35,000 volts over duplicate 3-phase lines, a distance of 92 ms., to the Kolar gold fields, where it is utilized almost entirely in mining operations.

The Cauvery River falls are located near the site of the old Hindu village of Sivasamudram. The Cauvery River is the dividing line between the Province of Mysore and the Presidency of Madras. At this point a fall of nearly 400′ is afforded, giving an average calculated h. p. of approximately 12,000 during the dry season of the year and a maximum of over 200,000 h. p. at times during the monsoon or rainy season.

Work on the first installation of the plant was started near the end of the yr. 1900, and was completed after many difficulties in June, 1902. The entire success of the scheme is thoroughly emphasized by the fact that the output of the plant has recently been almost doubled, in order to meet the demands of the Kolar gold mining companies for the cheaper power thus afforded. However, provision has been made whereby the City of Bangalore, which has 180,000 inhabitants, is to be supplied with light and power over a separate 60-m., 35,000-volt transmission line. This work has been completed.

River Works, Channels, Forebay and Pipe Lines.—About ¼ m. above the channel intake, the main river divides into two branches—one flowing E. and the other N. Two low-level masonry dams divert all of the water in the river during the dry season to the channel intake. The upper dam, located about ¼ m. above the intake, and blocking the eastern branch, diverts the water tending to flow that way. The main diverting dam, which is over 2,000′ long and V-shaped, extends across the northern branch of the river and finally unites with the natural inner rock wall of the intake channel. During high flood the water sometimes attains a depth of 6′ or 7′ over the top of the dam.

The headgates at the channel entrances are about ¾ of a m. distant above the Cauvery falls, while the power-house is located approximately 1 m. below the same. The two channels, of which some views are herein given, follow the natural contour of the country and are somewhat more than 3 ms. in length. They are of trapezoidal section, having stone-pitched sides, with a bed width of 18′ in earth cutting and 12′ in rock cutting. The dividing earth bank partition between the channel measures 26′ width at the base and 10′ on top. The gradient is 1/5000 for earthwork and 3/5,000 in rock cuttings.

Each channel is supplied with water from the intake channel at the headworks through four vents, each measuring 4½′ by 5′ section. The velocity of flow in the channels varies somewhat with the gate opening, but the average ranges from 2′ to 3′ per sec. Scouring sluice vents of 4½′ by 5′ section are provided on the river side of the intake channel. The two channels, finally brought together, form the forebay, which, in turn, is divided into two sections, though connected together as a whole. One section supplies water to the old penstocks (three in number), while the other supplies the five new stocks. The water might have been brought to the forebay over a much shorter route if wooden flumes could have safely been used; but local engineers considered such a proposition unsound owing to the danger of the flumes being ultimately destroyed by white ants.

The average depth of water in the forebay is between 5′ and 6′. A surplus quantity of water is always allowed to escape over a waste weir at one side of the forebay in order to provide for sudden increase of loads. From the two sections of the forebay, steel penstocks convey the water down the steep bluff to the generating station below. The stocks average 900′ length. Each of the five new penstocks supplies one 1,250-brake-h. p. Escher-Wyss horizontal impulse waterwheel, which is direct-connected through a rigid coupling to a 720-kw. General Electric 3-phase alternator. These penstocks vary from 36″ to 39″ in diameter. The old penstocks, three in number, varying in diameter from 45″ to 39″, after reaching the powerhouse bifurcate; each branch supplying one 1,250-h.p. turbine. Two expansion joints, adjusted for approximately 5″ expansion, are provided in each pipe line.

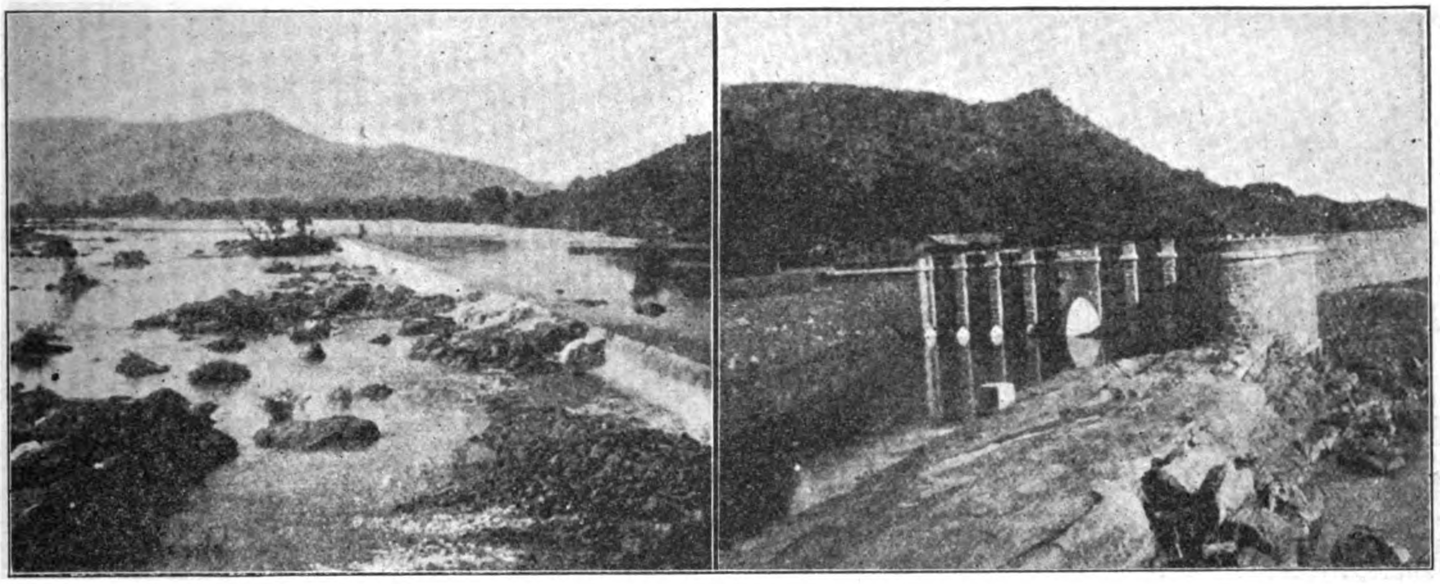
Entrance of water from forebay to penstock chamber is regulated by a plain vertical iron slide gate controlled by rack and pinions; at the entrance to each penstock is another valve operated by a handwheel. A 10″ main conveys

GUNGAN CHUCKI FALLS, CAUVERY RIVER, NEAR SIVASAMUDRAM. HINDU TEMPLE AND SMALL VILLAGE ON THE LEFT

BURR CHUCKI FALLS, E. BRANCH OF THE CAUVERV RIVER, NEAR SIVASAMUDRAM

VIEW OF CAUVERY FALLS DURING FLOOD SEASON, E. BRANCH OF RIVER

VIEW OF CAUVERY FALLS AT HIGH FLOOD, N. BRANCH OF RIVER



CAUVERY RIVER ABOVE THE HEADWORKS, SHOWING MAIN DIVERTING MASONRY DAM AND APPROACH TO INTAKE CHANNEL. THE OTHER VIEW SHOWS THE INTAKE CHANNEL AND HEADGATES AT SIVASAMUDRAM

the clear water from the settling chamber at one side of the old forebay to the generating station below, for the operation of the waterwheel speed regulators. Supports for the penstocks, for over $\frac{2}{3}$ their length, are masonry piers placed 15′ apart. The average gradient is somewhat more than 30 per cent. All of the penstocks are made of simple lap-riveted steel, varying from $\frac{1}{4}''$ to $\frac{1}{2}''$ in thickness. These and other piping in the powerhouse were supplied by Messrs. Mechan & Sons, of Glasgow.

Generating Station.—The generating station, or powerhouse proper, is a large building 56′ by 262′, outside dimensions. It may be well to state at this point that all of the principal buildings of the Cauvery power scheme are constructed of granite, and another variety of stone, commonly known as "black trap." Most of the material for the masonry work was obtained in the immediate vicinity.

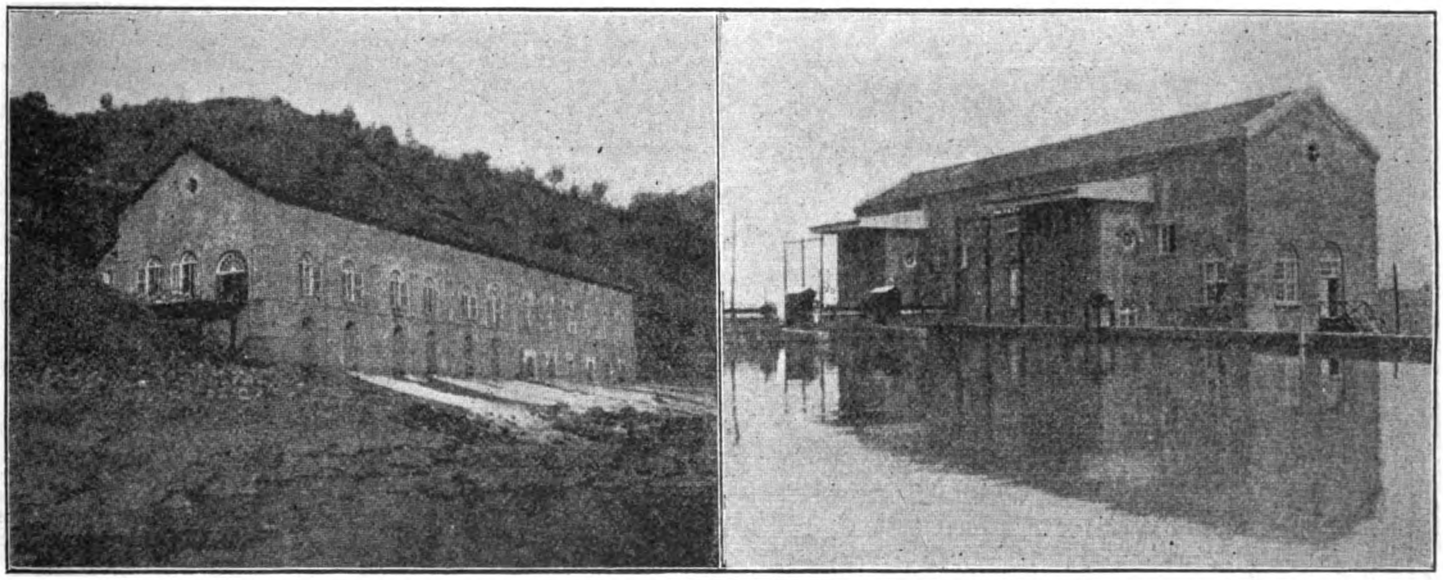
The generating station now contains eleven 1,250-h. p., 720-kw. hydro-electric units and three 125-h.p., 75 kw., exciter units. Switchboards are impaneled in the rear wall of the generating room, enabling the operator to switch any individual machine out of circuit should occasion require. Behind the rear wall of the generating room is an 8′ passageway extending the full length of the station and supplied on one side with stone shelves which support the lead-covered cables leading from the generators and direct-current exciter units to the long stone cable duct which leads up the steep face of the bluff to the transformer station above.

The general layout of generating units and piping within the powerhouse is roomy and convenient. The large turbines contain one solid-cast, 5′ impulse wheel having 24 buckets on its periphery. Each waterwheel has two nozzles which control the supply of water to the wheel proper through $3'' \times 5''$ rectangular openings. The nozzles are boot-shaped, with the fulcrum, or pivot-pin, at the heel. The height of the toe in the $3'' \times 5''$ admission vent determines the quantitative supply of water to the wheel.

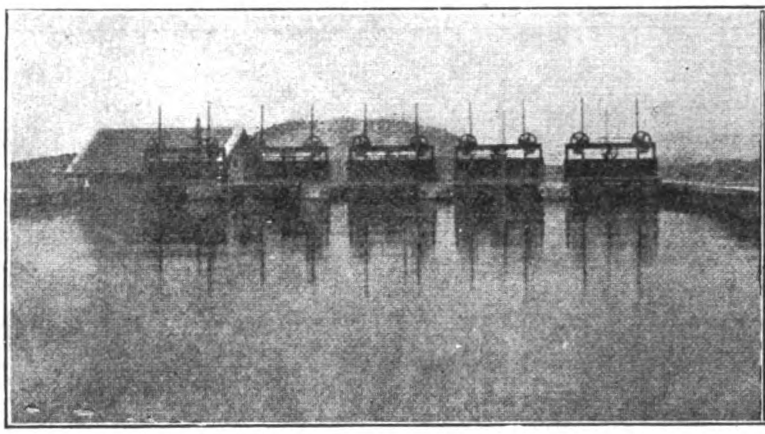
The three small exciter turbines are supplied with water through a 10″ main which is supplied by a tap from each of the large penstocks. The wheel proper of the small turbines is approximately 3′ in diameter with 36 buckets on its periphery.

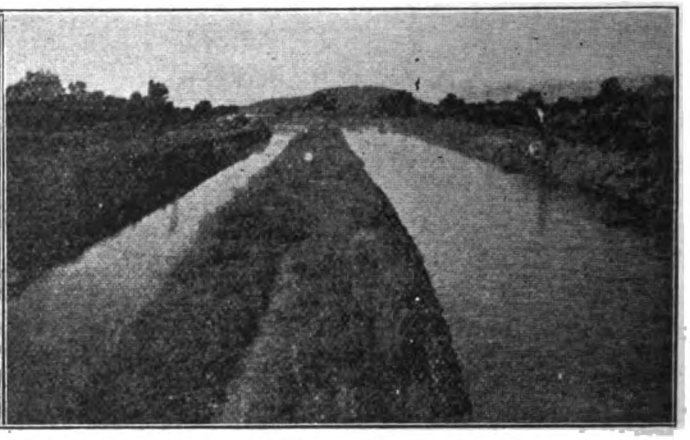
The most interesting feature connected with the turbines are the hydraulic governors, or speed regulators, which form a part of the wheel, being rigidly connected thereto. These governors are guaranteed by the makers to maintain the water pressure in the pipes constant within 5 per cent of normal under sudden variations of load. For a 10 per cent variation of load only 2 per cent change in speed is guaranteed and only 8 per cent change in speed for 50 per cent variation of load. As before stated, the clear-water pressure is supplied to that part of the governing mechanism which should be the least exposed to wear, hence it is of decided advantage to supply to these parts water which is free of fine sand or other gritty material. However, in case of failure of the clear-water supply, penstock water can immediately be supplied for this purpose through separate taps from the latter to each engine. The action of the hydraulic governor is, briefly, as follows:—

A variation of the station load produces a consequent change in speed of the waterwheel, from the shaft of which the movement is conveyed by means of chain transmission and gearing to the governor fly-ball. The latter, working against a stiff spring, effects a vertical movement of the small governor rod, which in turn controls the movement of a small control valve; the latter is kept constantly in motion by very slight changes of load tending to destroy the equilibrium of water pressure on top and bottom of the valve. So long as the speed remains constant the water pressure on both ends of the valve is maintained the same. A slight movement up or down of the control valve produces a relatively greater movement of the larger hydraulic piston, to which is attached through connecting rods the two large boot-shaped nozzles. In case of a great change of load



GENERATING STATION AT SIVASAMUDRAM, AND THE SET-UP TRANSFORMER STATION, WITH FOREBAY IN THE FOREGROUND





PORTION OF THE NEW SECTION OF FOREBAY, SHOWING THE VERTICAL SLIDE GATES AT THE ENTRANCE TO THE PENSTOCK CHAMBERS, AT SIVASAMUDRAM, AND A VIEW OF THE TWIN CHANNELS IN THE EARTH CUTTING APPROACHING SIVASAMUDRAM

such as that caused by a short-circuit on the transmission lines, resulting in the entire station load being eventually thrown off, a large relief valve quickly opens and allows the surplus or impact water to escape. This valve slowly closes against oil-pressure as the load resumes its normal value. Thus it will be seen that the relief valve takes care of the sudden impact of water when a large amount of power is suddenly switched off in much the same manner as the ordinary overflow standpipe for low-pressure heads. A general idea of the size and shape of the speed regulators may be obtained from accompanying photographs.

Turbines and Generators.—The guaranteed efficiency of the large turbines is 75 per cent and 70 per cent at full load and ½ load respectively, producing 1,250 brake h. p. at the coupling with 37 cu. ft. of water under an effective head of 382½′ at the turbines. Some 10′ of head were lost on account of having to locate the generating units above the highflood level of the river. The water during the major portion of the yr. is quite free from grit, and the steel cups, after 3 yrs.' service, show an almost imperceptible amount of wear.

The generators are 720-kw., 3-phase, 2,200 volt, 25-cycle, 300-r. p. m. machines of the revolving-field type and are Y-connected with nutral not grounded. Since these machines are of the well-known General Electric type, no further details are necessary regarding them; suffice it to state that they have given entire satisfaction and no trouble since the plant was first put in operation.

(To be continued)

GERMAN JEWELRY IN THE PHILIPPINES

United States Consul Brittain, of Kiel, Germany, reports as follows regarding shipments of jewelry from his consular district to Manila:

During the past 4 mos., or since it has been necessary to consulate invoices for the Philippine Islands, the jewelry manufacturers of Pforzheim have had invoices for Manila amounting to nearly $25 000. During the same period many shipments under $100 in value were made, which would probably increase the above amount very considerably. The jewelry consists principally of ladies' chains, brooches, earrings, bracelets, rings, and pins. Much of the jewelry is of 12 and 14 carats gold, and also cheaper goods.

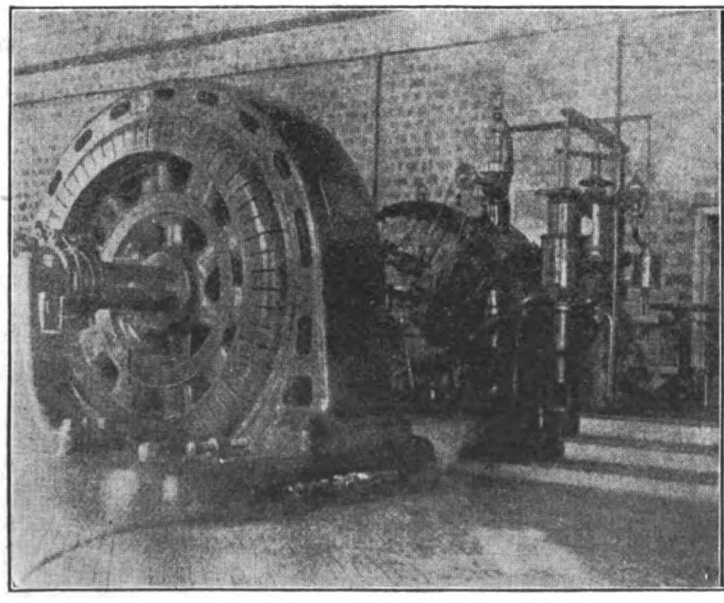
Pforzheim is a city of about 65,000 population and is devoted almost exclusively to the manufacture of jewelry, there being about 500 factories where jewelry is made. It is the jewelry center of Europe. The various manufacturers are very energetic and are careful to study the wants of their customers,, and endeavor to please them regarding designs, prices, and terms of sale. From present indications the shipment of jewelry to the Philippines will amount to about $100,000 for the fiscal year. With the American manufacturer's advantage in distance and machinery—as much of the Pforzheim jewelry is made by hand—it appears that we should capture more of the trade of the islands.

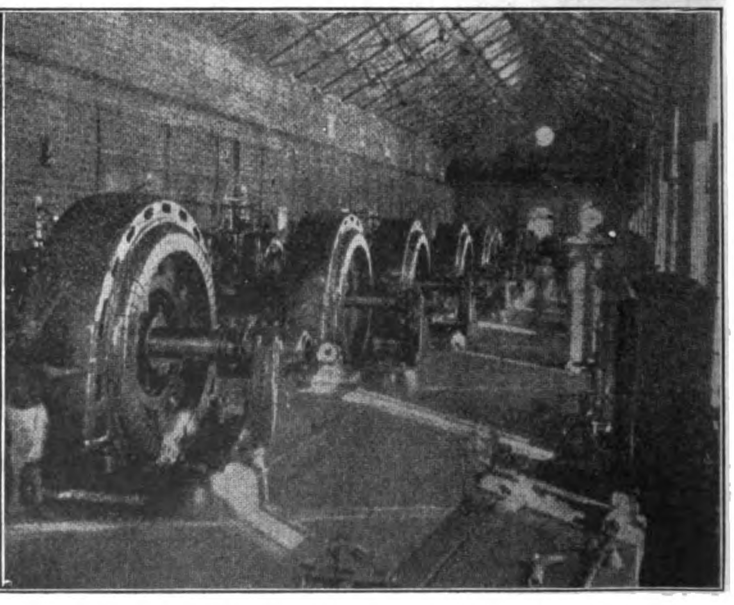
The facts are the German manufacturer often wins by easy terms of sale as to credits and discounts and making what the customer wants, in quality and design, and the American maker loses because he demands cash before his goods leave America, and attempts to sell in the Philippine Islands designs, suited to Philadelphia or New York trade. Recently a young German came to me and said he could sell 50 to 75 American machines of a certain make if he was sure the machines would do what was claimed for them.

REVIEW OF PUBLICATIONS

SHANGHAI—ITS SIGHTS AND SCENES.—We have received from Messrs Kelly & Walsh, Ltd., an artistically arranged album of photographic illustrations of the Settlement of Shanghai, and the surrounding country. The views are splendidly reproduced, and present the principal buildings of the "Paris of the Orient," scenes on its streets and of the river life, together with interesting and beautiful illustrations of the country just beyond the borders of the municipality. The album contains nearly 50 attractive illustrations for $2. It can be obtained at any of the stores of Messrs. Kelly & Walsh—in Yokohama, Shanghai, Hongkong, and Singapore.

GAS, GASOLINE AND OIL-ENGINES.—This is a new and revised edition of *Gas, Gasoline, and Oil-Engines*, by Gardner D. Hiscox, published by the Norman W. Henley Publishing Company, 132 Nassau-st., New York City, and is illustrated by 351 engravings. The book represents and illustrates the details of design, manufacture, and management of a new and progressive prime-moving power, and is brought up-to-date in a most exhaustive, interesting and instructive style. Price: $2.50 gold.



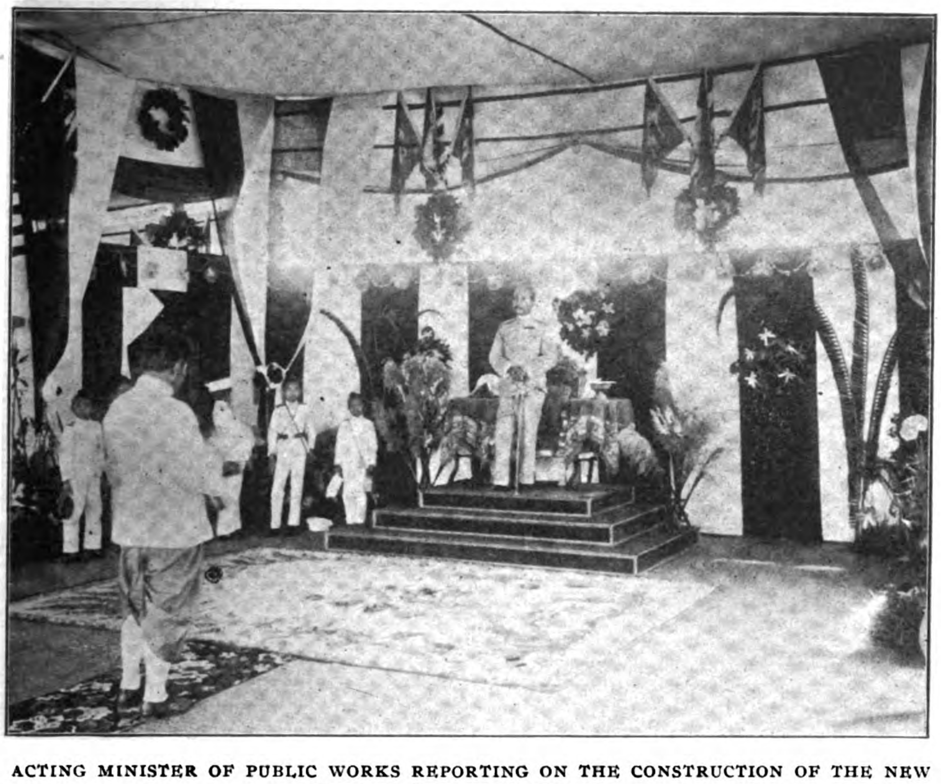


1,250 H. P., 720-KW., "GENERAL ELECTRIC" TURBO-GENERATOR UNIT SHOWING THE SPEED GOVERNOR; ALSO A GENERAL VIEW OF THE POWER STATION INTERIOR AT SIVASAMUDRAM

CONSTRUCTION OF BAN PHAJI-PAKNAMPOH SECTION OF SIAM RAILWAYS

The Ban Phaji-Paknampoh section of the N. line of the Royal State Railways of Siam, was recently opened by the king, with the usual ceremony. This line begins and branches off at Ban Phaji of the Korat line and traverses the whole length of the Menam Valley for the benefit of the people in their commercial and agricultural enterprises.

Mr. M. L. Weiler, director-general of Siamese railways, has furnished THE REVIEW with a copy of the report read by the acting minister of public works, before the King of Siam, on the occasion of the opening of the line, in which that official deals at length with the construction of the railway. Unfortunately for engineers, illustrations of the construction can not be had, the only photograph obtainable from the Royal Railway Department at Bangkok, at all available—even remotely—for these columns, being the one herewith presented.



ACTING MINISTER OF PUBLIC WORKS REPORTING ON THE CONSTRUCTION OF THE NEW LINE TO THE KING OF SIAM

COMMENCEMENT OF CONSTRUCTION.—Work on the Ban Phaji-Paknampoh line was begun in December, 1897, and the first section to Lopburi, 42 kilometers in length, was opened April 1st, 1901. From Ban Phaji to Lopburi the line traverses paddy fields with patches of jungles. The Menam Prasak is crossed at Tarua with a steel bridge of 103 meters. The country traversed is flat, Lopburi being only a trifle higher than Ban Phaji. Grades and curves are consequently very moderate. Owing to these facts only 460,000 cubic meters of earthwork were executed, at a cost of Tcs. 332,000, or Tcs. 7,800 per kilometer. For the acquisition of land only Tcs. 1,442 of Tcs. 34 per kilometer were spent. Besides the large bridge crossing the Menam Prasak there are two more steel and 28 wooden bridges on the line.

PERMANENT WAY.—The rails are the same as those used on the Korat Railway. In general, wooden sleepers were used, the greater part of which was supplied from the Korat District, the remainder being procured locally. For a stretch of 7 kilometers, iron sleepers were used as a trial. These sleepers are 2.25 meters long and have a weight of 54½ kilos. The cost of one iron sleeper, including freight to Bangkok, is Tcs. 6.50 against Tcs. 1.50 to Tcs. 1.75 of a wooden sleeper. The ballast was supplied from Pak Preo quarry. Platelaying was started in November, 1898, and the railhead reached Lopburi July 23d, 1900.

LOPBURI-PAKNAMPOH SECTION.—This section has a length of 118 kilometers. In May, 1902, the construction of this line was practically started in earnest. The line traverses a straight route through a rich rice district, which, in the absence of good waterways, promises a better revenue for the railway. In addition, sections of the country formerly practically out of reach and to a great extent covered with jungle, will be opened up for settlement. The country traversed is flat with slight variations, and the line is therefore fit to cope with goods and passenger traffic on a large scale.

For land acquisition the average cost was Tcs. 60 per kilometer, whereas Tcs. 2,091 per kilometer were paid on the Petchaburi line for this item.

Earthworks.—Of the 1,600,000 cubic meters of earth and rockwork built only 88,600 cubic meters were derived from excavations, which shows that the line is mostly lying on banks. The material for the construction of these banks was taken from borrow pits along the line, and consisted mostly of clay. The cutting material was rocky and near Chongkeh a solid rock cutting, consisting of hard lime stone, required the blasting of 10,382 cubic meters of rock. Special difficulty was met with in the filling of the bank from 158 kilometers to 160 kilometers, including Paknampoh station. Though these banks reach a height of 8 meters at places, the high flood nearly reached their tops. Extensive landslides occurred repeatedly during construction, and doubtless it will take years before the banks are properly settled. The station yard at Paknampoh alone required the execution of about 80,000 cubic meters of earthwork. These works were done by means of locomotive power in using first a light railway of 50 centimeters gauge and later on a full-gauged locomotive with 15 trucks. The total cost of earth and rockwork on the Paknampoh line was Tcs. 1,200,000 or Tcs. 0.75 per cubic meter, or respectively Tcs. 10,170 per kilometer against Tcs. 0.61 per cubic meter, as against Tcs. 9,203 per kilometer on the Petchburi Railway.

Permanent Way.—The rails for this section are the same as on the Korat liner. The ballast was provided locally from a number of quarries along the line. The orders for the permanent way material for the whole N. line to Chiengmai were 30,000 tons and amounted to £202,000, of which the greater part—£172,000—for rails, fell to English, and the remainder—£30,000—for small iron materials, to Belgium manufacturers. Platelaying was started April 1st, 1904, from Lopburi, and later on also from Paknampoh. The connection of the rails took place August 28th, 1905.

STATION BUILDINGS.—On the Lopburi-Paknampoh section the station buildings are wooden structures with roofs of corrugated iron. A locomotive shed with turntable is provided at both Lopburi and Paknampoh.

ROLLING STOCK.—Rolling stock is being used for both the Korat and Lopburi lines together. Altogether 18 locomotives, 36 passenger coaches and 251 freight and ballast cars have been purchased. In closing the account of both lines Tcs. 357,000 were transferred from the Korat to the Lopburi line, leaving a balance of Tcs. 1,600 for the Korat line. The rolling stock bought on account of the Paknampoh line consists of 12 locomotives and 187 carriages. The Locomotives were bought in Gemany for the total sum of Tcs, 512,000, while the orders for the 187 carriages were placed by tender with a firm in Belgium, the total amount being approximately £39,000.

EXTRAORDINARY WORKS.—The increase of traffic to be expected between Bangkok and Lopburi owing to the opening of the new line to Paknampoh necessitated the extension of existing station yards between Bangkok and Lopburi, as also the arrangement of new crossing stations. The expenses for these works, including all materials, will amount, when completed, to about Tcs. 150,000.

The total cost of the Lopburi line was Tcs. 2,050,000 or Tcs. 48,200 per kilometer. The total cost of the Paknampoh line cannot yet be ascertained exactly as the construction is not fully completed. The Director-general of railways estimates that the total cost of the Paknampoh line will be near to Tcs. 6,800,000 or Tcs. 57,600 per kilometer. The Korat Railway has cost Tcs. 67,000 per kilometer; the Lopburi line Tcs. 48,200; the Petchaburi line Tcs. 53,300. The average cost of the total railway system amounts to Tcs. 60,703 per kilometer, with which the average cost of the Paknampoh line compares fairly well.

AMERICAN ASSOCIATION IN CHINA

The annual meeting of the American Association in China was held recently in the Chamber of Commerce of Shanghai. The treasurer's report showed a credit balance in the Hongkong and Shanghai Bank of $1,180.38. The following officers were elected for the current year:—President Dr. Gilbert Reid; vice president, Mr. J. F. Seaman; secretary, Dr. C. M. Lacey Sites (reëlected); treasurer, Mr. A. J. Thomas; executive committee, Dr. Gilbert Reid and Messrs. A. S. Fobes, S. Fessenden, P. W. Irvine, Dr. Sites, Mr. W. A. Reed, Mr. Seaman, Dr. C. S. F. Lincoln, Dr. A. P. Parker, Mr. Thomas, and Mr. Tucker.

REORGANIZATION OF S. C. FARNHAM, BOYD & CO., LTD., SHANGHAI

The great shipbuilding and general engineering business of Messrs. S. C. Farnham, Boyd & Co., Ltd., of Shanghai, was recently reorganized. The affairs of the old company will be wound up voluntarily by liquidators who are authorized to register the new concern under the name of The Shanghai and Engineering Dock Company, Ltd. At the meeting which resulted in this action 33,000 shares were represented, and Mr. J. Prentice, managing director of Messrs. S. C. Farnham, Boyd & Co. presided. The directorate of the new company will be composed of the following gentlemen: —Mr. J. Prentice, managing director; Sir. C. J. Dudgeon, of Messrs. Ilbert & Co., Shanghai; Mr. W. J. Gresson, of Messrs. Jardine, Matheson & Co., Shanghai; Mr. A. Korff, of Messrs. Melchers & Co., Shanghai; Mr. James Johnston, Mr. H. von Rücker, and Mr. S. Groundwater.

Engineering Progress During the Fiscal Year 1904-05 in the Reconstruction of Manila

CITY HALL, BAGUMBAYAN DRIVE, DURING THE FLOOD OF JULY 13th AND 14th, 1904

The report of the Department of Engineering and Public Works of the City of Manila for the fiscal year ended June 30th, 1905, just issued as a section of the annual report of the Municipal Board, furnished abundant material of a most interesting nature covering the operations of this department during the period under consideration.

All the business of the entire department is conducted through the general office. From July 1st, 1904, to November 10th, 1904, Major J. F. Case, the then city engineer, was on leave of absence in the United States, and the work of the department was carried on by Mr. S. B. Patterson, 1st assistant city engineer. On April 1st, 1905, Major Case was relieved of the duties of City Engineer to become Chief Engineer, Department of Sewer and Waterworks Construction. From that date to the end of the fiscal yr. 1905 the department was under the direction of Mr. H. E. Hyde, 1st Asssistant Engineer, as Acting City Engineer.

Water Supply and Sewers.—This division includes everything connected with the water supply of Manila, including the pumping station at Santolan; also all work connected with the building of sewers and drains. The work of filling the moat was also carried out under the direction of this division. Considerable work was done during the fiscal year at the pumping station, as the high water of the previous yr. nearly carried out the dam located in the Mariquina River, from which all city water is pumped. The walls of the dam and the intakes had to be practically rebuilt. The dam is now in better condition than ever before. The pumping machinery itself gave little trouble, although two of the pumps have been in operation 18 yrs., the other two having been installed during American occupation. The floods of 1904 caused considerable damage to the 26-in. pipe or conduit which carries the water from El Deposito to the city-distribution system. The pipe line was realigned, and from El Deposito the San Juan Bridge raised on concrete piers, thus elevating the pipe above the ground and preventing any further damage from washouts. Below the crossing at Santa Mesa Road the conduit was lowered a large part of the way and is now free from proposed streets, etc. El Deposito or the large storage reservoir has been thoroughly cleaned and repaired where necessary, and during the period under consideration experiments were carried on here to determine the action of copper sulphate on amœbæ, but the experiment did not prove a success as far as the destruction of the amœbæ was concerned.

An accurate survey of the reservoir and grounds was made and the storage capacity of the reservoir determined. The storage capacity is approximately 19,000,000 United States galls.

The city-distribution system has been kept in good repair and considerable work done on the installation of new mains and hydrants. At present the water service is insufficient for fire protection, this being most apparent in Paco and other outlying districts of the city.

In 1904 a road locomotive and cars were purchased for the purpose of hauling coal to the pumping station and gravel from the Mariquina River, the gravel being used to resurface the Santolan Road. There are approximately 200 tons of coal used per mo. at the pumping station, and the cost of hauling this coal by team was about ₱4 per ton. The cost of hauling by the engine is considerably reduced.

Draining and Filling of Moat and Lowlands.—Among the most important works undertaken by this division was the draining and filling of the moat and lowlands. Work was commenced without the possibility of more than a reconnaissance survey of the improvement. In all three outfall sewers were decided upon, one discharging to the W. end of Calle Bagumbayan into the bay and two at the W. of the S. approach to the Bridge of Spain.

The first, to drain that part of the Walled City limited approximately by Calles Palacio and Anda and the W. wall, was given an outfall S. of the new harbor works. At its junction with the wall two branches were extended along the outside of the wall, one NW. to the old outfall of the Calle Anda sewer at the bastion on Calle Anda and the other NE. to the old Real Gate. The second, draining that part of the Walled City limited by Calles Anda and Palacio and the E. wall was constructed from the old arch culvert under the roadway W. of the Bridge of Spain to the bastion at that point and thence along the outside of the wall to Calle Victoria. The old box sewers in Calles Baluarte and Fundacion were discharged into the sewer at the Victoria Gate. The third, draining that portion of Ermita limited by Washington Boulevard, Calle Arroceros, and the moat, was built along the wall of the outer moat and discharged into the old arch culvert at the E. side of the Bridge of Spain. Spillways were designed to control the overflow of water from the sludge pipe, and were installed at Fort Santiago and at the Bridge of Spain W. of the S. approach.

The general method of construction was uniform throughout. Wooden piles 2″ × 4″ × 4″ were driven at a distance of from 3′ to 5′ apart to the depth of about 16′ into the ground, braced at the bottom against the wall along the sewer grade, and firmly nailed. On the outer faces of the piles 2″ planking on edge was driven to a firm foundation about 2′ below the determined invert of the sewer, nailed to the piles, and closed with light battens at the joints. This planking was carried about 1′ above the elevation of the spillways. Little leakage occurred along these joints, indicating careful work.

It was difficult, however, to secure a tight joint at the bottom, and considerable leakage of mud into the sewer was encountered. To reduce this leakage a series of gates was constructed to afford a back hydrostatic pressure in the sewers. Upon sufficient drying out of the mud these gates were removed and the water allowed to drain off. The sewer discharging at the Malecon Drive was protected by banks of earth along both sides to prevent overturning, as filling by the dredger did not proceed simultaneously on both sides.

Method of Filling.—The dredger was connected to a 24″ steel pipe extending along the S. side of the area lately reclaimed in the harbor improvement, N. of the Legaspi monument, to the moat. Branches were laid from this as the work required. The surplus water was allowed to flow over the spillways already mentioned and flashboards inserted as necessity for preventing passage of the mud occurred. Careful attention was paid to the flow of the mud and regular inspections made of the pro-

visional sewers. Filling commenced on February 12th and the dredge stopped pumping on May 18th. After 6 wks. of settling the filling subsided about 6″.

A great quantity of shells was deposited near the discharge end of the pipe, and this material was used in building dams for the lowland filling and for backfill at several points along the provisional sewers. This material affords an excellent foundation for pipe sewers and a quantity has been stored in the yards for sewer work.

Filling Low Grounds.—The territory affected by this filling extended from Bagumbayan Drive to Calle San Marcelino and the Estero de Concepcion and from Calle Concepcion to and beyond Calle Nozaleda, terminating at the E. side of Camp Wallace but excluding that land occupied by the storehouses of the United States Army. An earth dike about the limits of this area was thrown up so as to control the liquid mud, and four spillways were constructed to discharge into the Estero de Concepcion. This dike was reenforced with shells deposited by the sludge pipe. The method of filling was precisely that used for the moats.

Cost of Work.—The total cost of filling the moats and low grounds was as follows:

Materials	₱22,839.97
Labor	15,724.70
Transportation	1,324.15
Engineering and superintendence	830.35
Total	40,719.17

Miscellaneous Works Necessitated by the Filling.—Consequent upon the filling of the moat and low grounds the drainage system of the Walled City and a portion of Ermita was affected, necessitating several minor structures.

The closing of the outlets to the gutters on the Malecon required some provision for drainage of the roadway, and a 30-centimeter box gutter was built on the E. side of the drive from the Santa Lucia building to the Pasig River and from Santa Lucia gate to the provisional sewer discharging at the Legaspi monument. This work cost in all for the 947.3 meters laid ₱3,596.12, or ₱3.81 per meter.

A similar condition held with Calle Nozaleda and Bagumbayan Drive. It was decided to make the necessary work a permanent one and a 15″ vitrified-clay pipe sewer reducing to 12″ was laid from the Estero de Concepcion to Bagumbayan Drive. The sewer will provide for all drainage on Nozaleda and Bagumbayan Drive and will be a portion of the final drainage system.

Size	Length in meters	Cost.	Cost per meter.
15 inch	175	₱2,657.10	₱15.19
12 inch	175.75	2,247.99	12.79

For the drainage of the land about the United States Army storehouses and the morgue a 12″ vitrified-clay pipe 70 meters in length was laid to the Estero de Concepcion at a cost of ₱680.59, the portion of the labor furnished by United States Army not being charged to the work. The cost per meter was ₱9.72.

Temporary wooden inlets from the Bagumbayan Drive to the filled moat were laid and a permanent catch-basin constructed at the corner of Calle Concepcion at the Calle Victoria extension, costing ₱70.61.

Storm-Water Drainage.—Estero levels were taken by gauges located throughout the city. Observations commenced at noon on January 9th, 1905, readings being made of the gauges at the stations at intervals of an hour and a half, day and night, continuously. There were established in all 26 gauge stations.

The work was done by natives who were more or less familiar with rod readings, etc. There were in all 24 men employed to make the gauge readings. These men were divided into day and night shifts of 12 hrs., with a foreman and assistant foreman to each gang. Three were assigned to each observer, at distances apart not greater than might be covered in 30 mins. by walking, were graduated into meters, decimeters, and centimeters. Readings were taken to the nearest centimeter. Capillary attraction was neglected. The results obtained were in general satisfactory, though occasionally errors were made which, however, were of so apparent a nature that they were easily eliminated. Curves plotted with time intervals as abscissas and heights above mean lower low water as ordinates were drawn.

A study of these curves reveals the following:

(*1*) High water in the esteros occurs at a more or less definite period of time after high water in the bay, depending upon the distance from the bay.

(*2*) Low water in the esteros is higher than in the bay.

(*3*) High water in the esteros is always lower than in the free bay.

(*4*) At a point near mean tide the level of water in the bay and in the esteros is equal.

(*5*) It can be assumed that during the dry season the water in the esteros is wholly tide water.

(*6*) The velocity of the water in the esteros is therefore small, and during this time silting up of the esteros is greatest.

(*7*) Most of the silting up will occur at ebb tide when the hydraulic radius is decreasing.

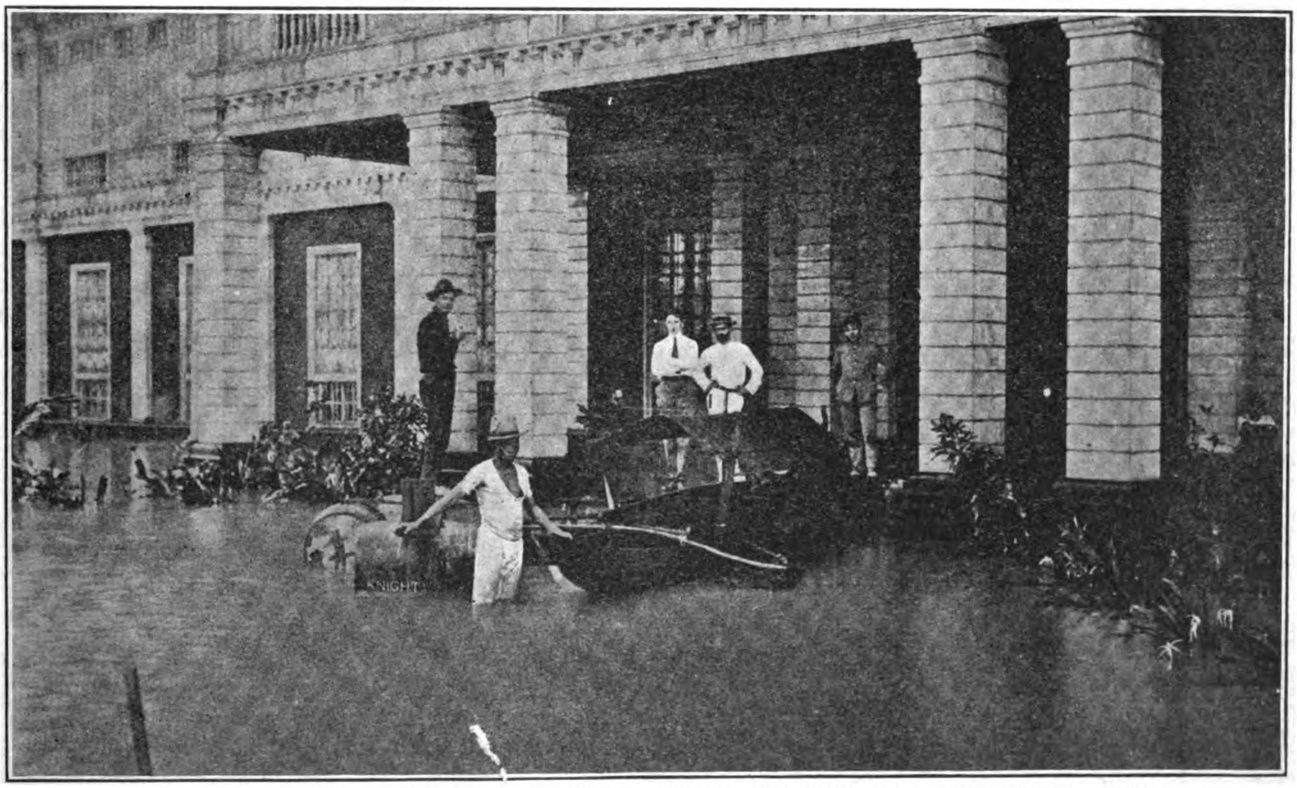
It is believed that the esteros should be deepened by dredging so as to give a greater velocity of flow by increase in the hydraulic radius.

Rainfall.—In the previous annual report it was noted that only 16 rainfalls of 2″ per hr. intensity had been recorded. Closer examination of the Weather Bureau records revealed the fact that there occurred five storms during the past fiscal year of intensities greater than 3″ per hr. From this information it was seen that to provide for rainfalls of less than 2″ per hr. as fixed in the preliminary design would be distinctly unwise. Sewers constructed under assumption of a 2″ rainfall and a run off 75 per cent have shown no evidences of failure and have not been the cause of any serious flooding of the streets. On the other hand, it would be extremely unwise to design sewers to provide for these excessive rainfalls because of necessary economy in expenditures, of the small headroom possible, and of the restricted cross section of the esteros and the Pasig River on which the discharge at high water is largely dependent. Furthermore, these excessive rainfalls occur only over small periods and flooding in the low districts which must happen in any event will not cause serious inconvenience.

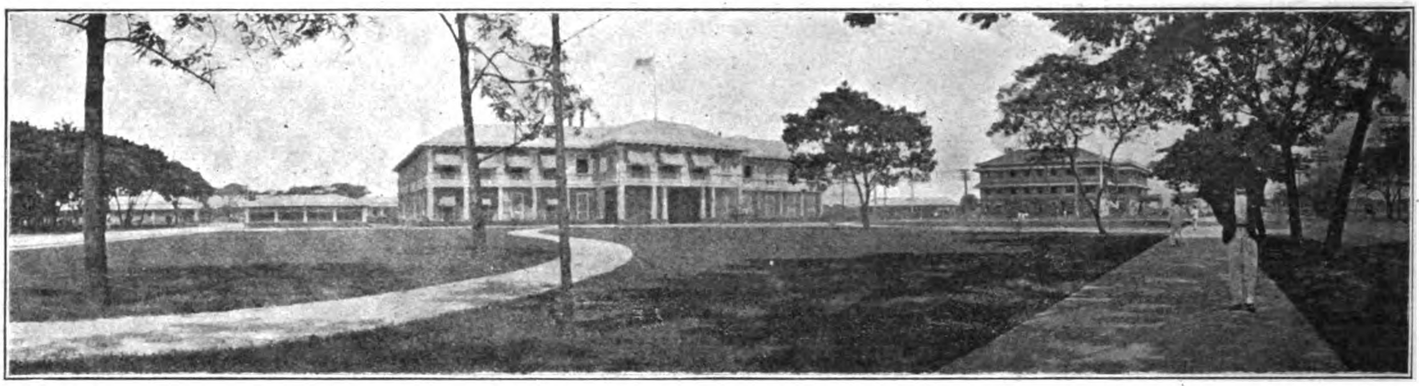
Run-off Coefficient.—Rough observations on flow toward inlets indicate that the assumption of the coefficient of run off, 75 per cent, is not warranted in all districts, being too small in the Walled City and too great for the less-built-up sections. Certain modifications were, therefore, required. The modified coefficients decided upon were as follows:

	Per cent.
For heavily built-up sections	90
For ordinary business and residential sections	75
For suburban sections	50

Inlets.—The rule establishing the maximum run in gutters of 120 meters has been shown to be insufficient to satisfy the conditions. Long runs in gutters prevent the speedy removal of the water from the street surface and bring about unnecessary flooding. The



BUREAU OF PRINTING, BAGUMBAYAN DRIVE, DURING THE FLOOD OF JULY 13TH AND 14TH, 1904



BUREAU OF PRINTING AND CITY HALL, SHOWING IMPROVEMENTS OF GROUNDS, 1905

inlet gratings are satisfactory and pass easily the water, but the street grades are too flat to bring the water up to them quickly enough. The maximum run in gutters has now been fixed at 100 meters.

All inlets constructed during the year were provided with silt basins, and the effect of this construction upon the sewers was quite noticeable in the June inspection. Very few street washings have passed the basins and the sewers are reasonably clean.

Street Grades.—This important matter demands prompt attention. Without a proper reconstruction of the streets parallel with sewer construction there will be no economy, and in the lack of attention to this detail sewers will be built which will be of only temporary utility. Grades for several districts have been designed, but the available force is too small to allow of the work being carried to a rapid completion. It has come to the attention of the office that curb elevations have been changed without its knowledge, thereby seriously affecting the drainage schemes. It is strongly recommended that no future changes be made without previous consultation.

The minimum grade adopted—2 per 1,000—has been found no more than sufficient to remove water from the streets, and any reduction in this, even at the cost of a large amount for filling, would be extremely unwise.

Construction.—Thirty new sewers were designed and built during the year. There were several sewers whose construction afforded more than passing notice. The drainage of the District of Binondo was notably in bad shape, and examination of the sewers before relaying of the pavements on Calle Rosario and the Escolta was required. The sewers on these streets and Calle Nueva were in almost a falling condition and in danger of rupture. The Escolta sewer W. of Calle Nueva, indeed, fell in upon uncovering and was entirely rebuilt of concrete in place. The roof of the Nueva sewer was repaired with concrete, a new concrete invert was laid, and the sides plastered with cement mortar. Only little attention could be given to the Rosario sewers because of the necessity of clearing the street in advance of the repaving. Whenever possible advantage was taken of the old work and the sewers trimmed up so as to reduce as far as might be the friction coefficient. All down-spout connections and drainage pipes were directly run to the sewers. The complete drainage of the district immediately surrounding the Cuartel de Meisic was affected by the construction of sewers on Calle Elena and Calle Soler and across some private lands. The low district about Calle Gallera was also drained by a concrete sewer discharging into the bay.

All structures over 60 centimeters in diameter were built of gravel concrete in the trench. Except in the case of the Cuartel de Meisic main sewer, no reenforced concrete was used, but in that case the headroom was so small that an especially reenforced top was required, which was built of old girder rails spaced 1′ apart and covered by concrete filling.

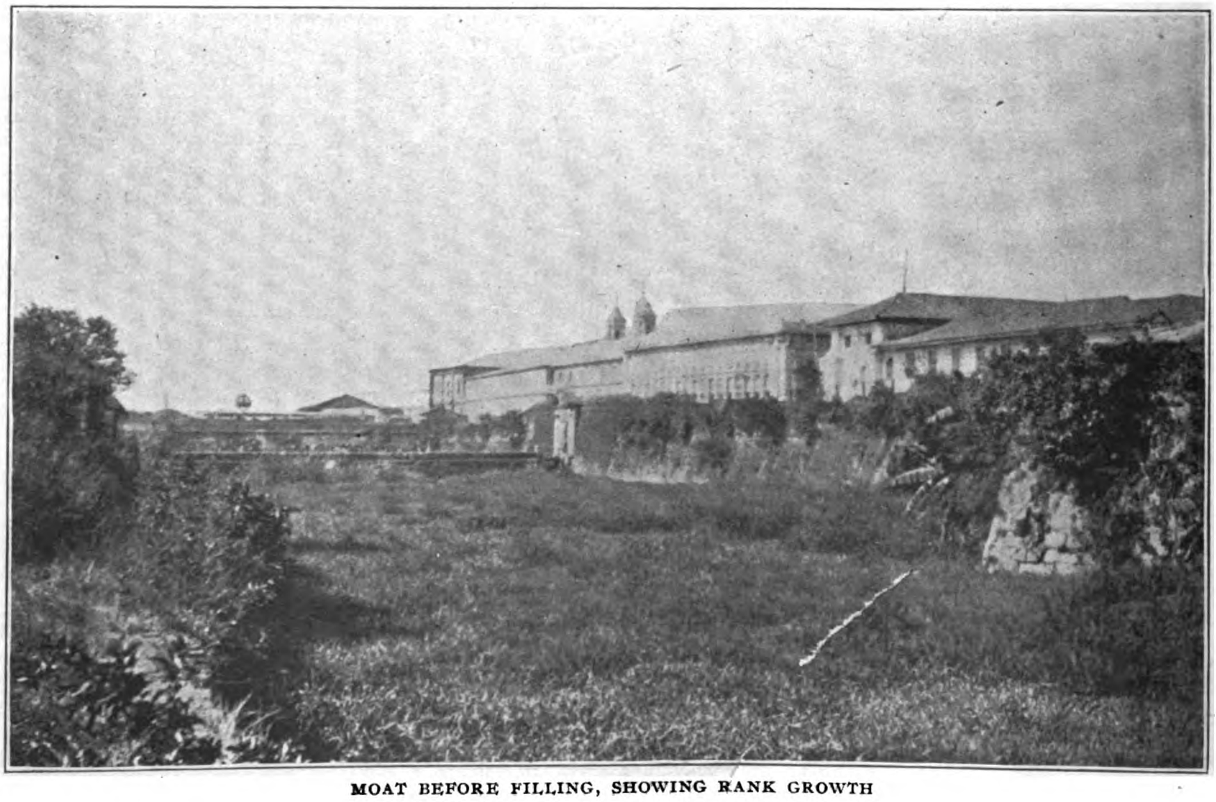
Estero Cleaning.—A small amount of work was done, but more attention should be given to the water courses, which have rapidly silted up. These courses should without doubt be cleaned and deepened, and it is hoped that this work may be carried on during the present year with the 8″ Gould centrifugal pump soon to arrive.

Building Operations.—The total building permits issued during the fiscal yr. were 5,435, as against 5,102 in 1903-4, making an increase of 333.

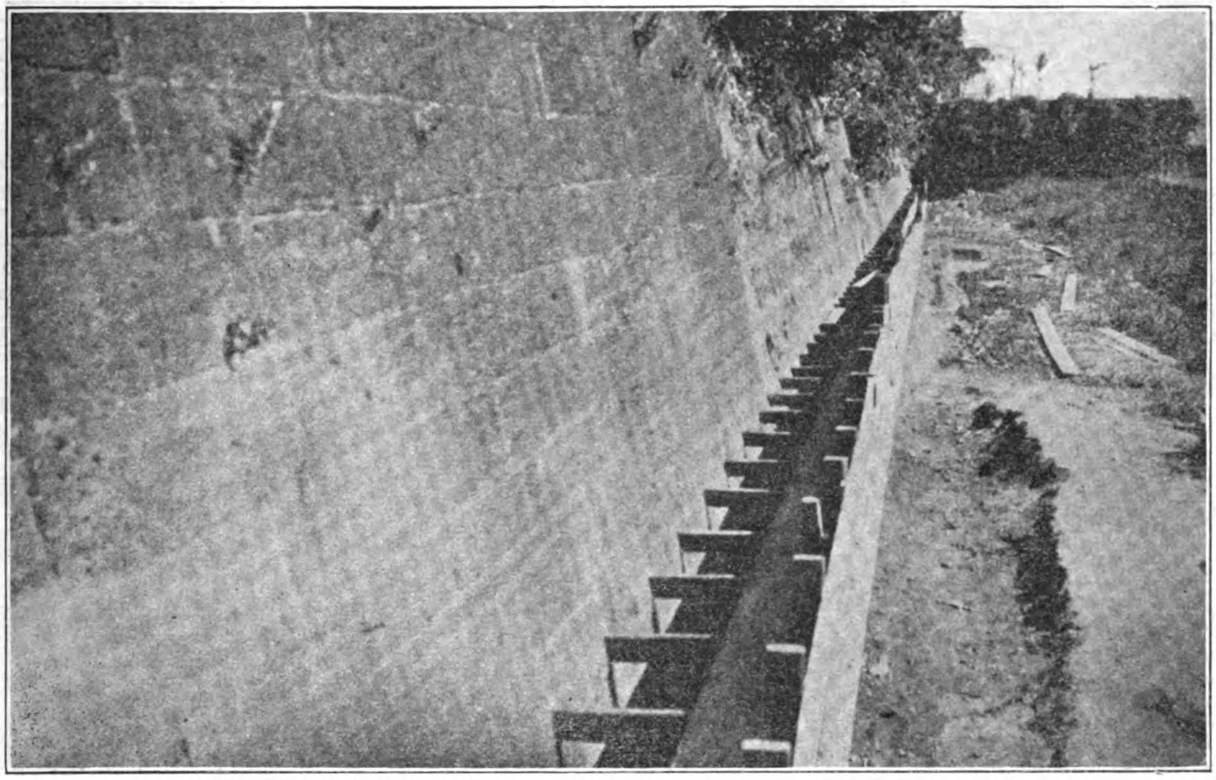
Public Lighting.—The municipality had lights in operation at the close of the yr. as shown by the following statement:—

Arc lights:	
2,000 candlepower (streets)	286
2,000 candlepower (harbor)	15
2,000 candlepower (parks and grounds)	2
2,000 candlepower (matadero)	4
1,500 candlepower (markets and public buildings)	17
Total arc lights	324
Incandescent lights:	
20 candlepower (streets)	936
20 candlepower (Divisoria market)	100
16 candlepower (municipal buildings)	1,056
10 candlepower (municipal buildings)	4
Total incandescent lights	2,105
Fan connections	25
Motors	6

The foregoing shows an increase over the previous yr. of 25 arc lights and 98 incandescent lights (public buildings); also a decrease of 126 incandescent street lights, which is brought about by the discontinuance of that number and substituting arc lights, greatly benefiting the service. Total cost of public lighting for the yr., ₱101,729.81. Total cost of repairs and increases to electrical service for the yr. amounted to ₱1,779.23.



MOAT BEFORE FILLING, SHOWING RANK GROWTH



TEMPORARY DRAINAGE SCHEME IN MOAT WHILE BEING FILLED

Telephone Service.—The total cost of telephone service for the yr. was ₱2,468.22.

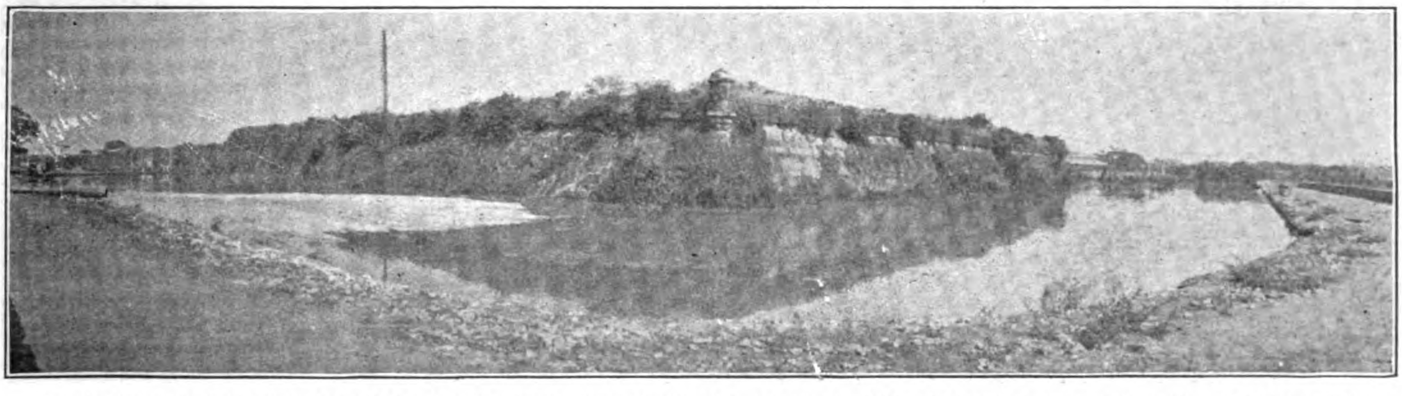
STREET CLEANING.—The very extensive work of the department of street cleaning, collection and disposal of city refuse, street sprinkling, land transportation, parks, and cemeteries was materially extended. The night collection of garbage and night soil and the cleaning of the streets was not changed, as the system inaugurated the previous yr. has proved very satisfactory. The pail-conservancy system, or collection of night soil, was developed to a point where the number of pails installed in private buildings was almost doubled. In July, 1904, a total of 52,794 pails were cleaned, whereas in the month of June, 1905, the department handled 95,254 pails. In addition to being well operated from a sanitary standpoint, this work was found to be profitable, and the monthly revenue to the city is gradually increasing. The work of cleaning vaults shows an increase of about 20 per cent over the fiscal year 1904. Over 3,500,000 square meters of streets are cleaned daily at the small cost of ₱0.09 (4½ cents, United States currency) per 1,000 square meters. The Palomar crematory was shut down on May 1st, 1905, and all the garbage, etc., formerly cremated at this place is now carried to the Cementerio del Norte and used for filling. Many improvements have been made in this new cemetery in the way of laying out and grading the plots on each side of the main road, the planting of trees, and the converting of suitable spaces into grass plots. La Loma Cemetery was closed for burials on April 1st, 1905, and very few burials are being made at the Paco Cemetery, which is almost full. Nearly every street in the city is sprinkled once a day by means of wagons, hose, and sprinkling cans, and the important streets are sprinkled three times per day. The total cost of street sprinkling was ₱56,929, which is at the rate of 25 centavos per 1,000 square meters sprinkled by wagons and 11 centavos by hose. It is expected that arrangements will soon be made with the electric street railroad to sprinkle all streets on which car tracks are laid at a much less cost than the present system.

STREET CONSTRUCTION AND BRIDGES.—Each district of the city is in direct charge of an inspector who reports daily to the chief inspector the condition of the streets in his district, the progress of work, and at the same time consults with him as to the best method of prosecuting the work. The following table shows the class of labor employed in the actual work of street construction and repair of bridges, the assignment by districts and the rate of pay *per diem*, per mo., which does not include the force employed on launches, barges, or at the city quarry:—

Class of labor.	Division, by districts: No. 1.	No 2	No. 3.	No 4	Bridge	City	Rate: Per month	Per day
Chief inspector	....	....	....	....	....	1	₱266.66	......
Inspectors:								
Class A	....	1	....	....	....	....	233.34	....
Class B	1	..	1	1	....	....	200.00	....
Bridge	....	....	....	....	1	....	200.00	....
Sidewalk	....	....	....	....	....	1	....	₱6.50
Foremen:								
Directing prisoners	1	....	....	....	....	....	....	6.50
On cement work	1	....	....	....	....	....	....	7.00
First class	1	2	1	1	1	....	100.00	....
Second class	....	1	2	....	....	....	70.00	....
Third class	6	3	2	4	....	1	....	1.50
Fourth class	3	3	5	2	....	....	....	1.20
Road-roller engineers:								
Class A	1	....	1	....	....	....	150.00	....
Class B	....	1	....	....	....	....	100.00	....
Carpenters	....	....	....	....	11	....	....	1.50
Masons	15	15	7	1	12	....	....	1.50
Blacksmith	....	....	....	....	1	....	....	1.20
Laborers	88	106	78	59	33	....	....	1.00
Total	117	132	97	68	59	2	....	....

Hired and City Transportation.—The following table shows the amount of city and hired transportation used during the yr., the transportation of the Insular Purchasing Agent being consolidated with that of the city:—

Month	City transportation: Double team, at ₱6 per day.	Dump cart, at ₱3.75 per day.	Hired transportation: Double team, at ₱10 per day.	Dump cart, at ₱6 per day.	Bull cart, at ₱6 per day
1904					
July	179	421	553	....	36
August	195	310.5	877.5	....	25
September	195	272	843	145.75	....



SECTION OF MOAT, SHOWING PIPE DISCHARGING HARBOR DREDGINGS FROM THE ATLANTIC GULF AND PACIFIC COMPANY'S POWERFUL DREDGE *MANILA*

MOAT FILLING ALMOST COMPLETED

October	456	458	269.5	191	....
November	424	608.5	275	199.5	....
December	351.5	818	322	180.5	....
1905.					
January	356.5	1,166	266.5	183.5	....
February	262.5	703.5	341	168	....
March	307	496	448.75	187.75	....
April	764	438	117	124	....
May	600.5	774.25	....	....	....
June	738.5	524.5	....	....	....
Total	4,830.5	6,990.25	4,313.25	1,380	61

Wood-Block Paving and Installation of Cement Sidewalks and Curbing of Calle Rosario, Escolta, and Plaza Moraga.—The contract for laying a wood-block paving on a 15-centimeter concrete foundation and filling the joints with paving cement was let in February, 1904, to H. A. Belden, manager for J. G. White & Co., at the following figures:—

For removing the old block paving, including all excavation and compacting subgrade, ₱2 65 per cubic meter.

For furnishing and laying a 15-centimeter concrete foundation, ₱2.20 per square meter.

For laying a wood-block pavement and filling the joints with paving cement, including the transportation of blocks furnished by the city, ₱1.15 per square meter.

Before the contractor could commence work it became necessary for the city to install cement curbing and to examine the sewer and water pipes and to rebuild the Escolta sewer. The sewer and water work was performed by the office of water supply and sewers. Each property owner was informed of the proposed work and notified to have all necessary connections made before the new pavement was installed. All the property owners agreed to have the city install cement walks in front of their property at a cost to the property owner of ₱3.60 per square meter. This work was performed in conjunction with the installation of cement curb. The line used on Calle Rosario was for an 18-meter street, a width of 12 meters between curbs being allowed for the roadway. The width of the sidewalks will be 3 meters when buildings are moved back to the new line. The line used on the Escolta was for a 14-meter street, a width of 9 34 meters between curbs being allowed for the roadway. The width of the sidewalks will be 2.33 meters when the present buildings are moved back to the established line. The present width of walks on the S. side of the Escolta from Calle Soda to Plaza Goiti in a number of places is less than ½ meter. It is thought that the owners along this section will make the necessary alterations to their buildings in the near future so as to provide the proper width of walk on this side of the street.

Cost of installing wood-block paving on Rosario, Escolta, and Plaza Moraga

		Square meters.
Total area between curbs		11,094.19
Track and 18 inches each side		4,341.54
Area paved at city's expense		6,752.55
Total cost of excavation, concrete, and laying wood blocks (area of track section not included)		₱41,150.49
Wood blocks, 300,218, at ₱92.78 per 1,000 (plus 10 per cent)	₱30,639.65	
Wood blocks, 336,588, at ₱79 per 1,000 (plus 10 per cent)	29,249.49	
		59,889.14
Total cost of paving		101,039.63
Less track section:		
Concrete foundation, 4,341.54 meters, at ₱2.20	₱9,551.39	
Wood blocks, 249,204, at ₱79 per 1,000 (plus 10 per cent)	19,687.12	
Laying wood blocks, 4,341.54 square meters, at ₱1.15	4,992.77	
		34,231.28
Total cost to city for laying 6,752.65 square meters		66,808.35

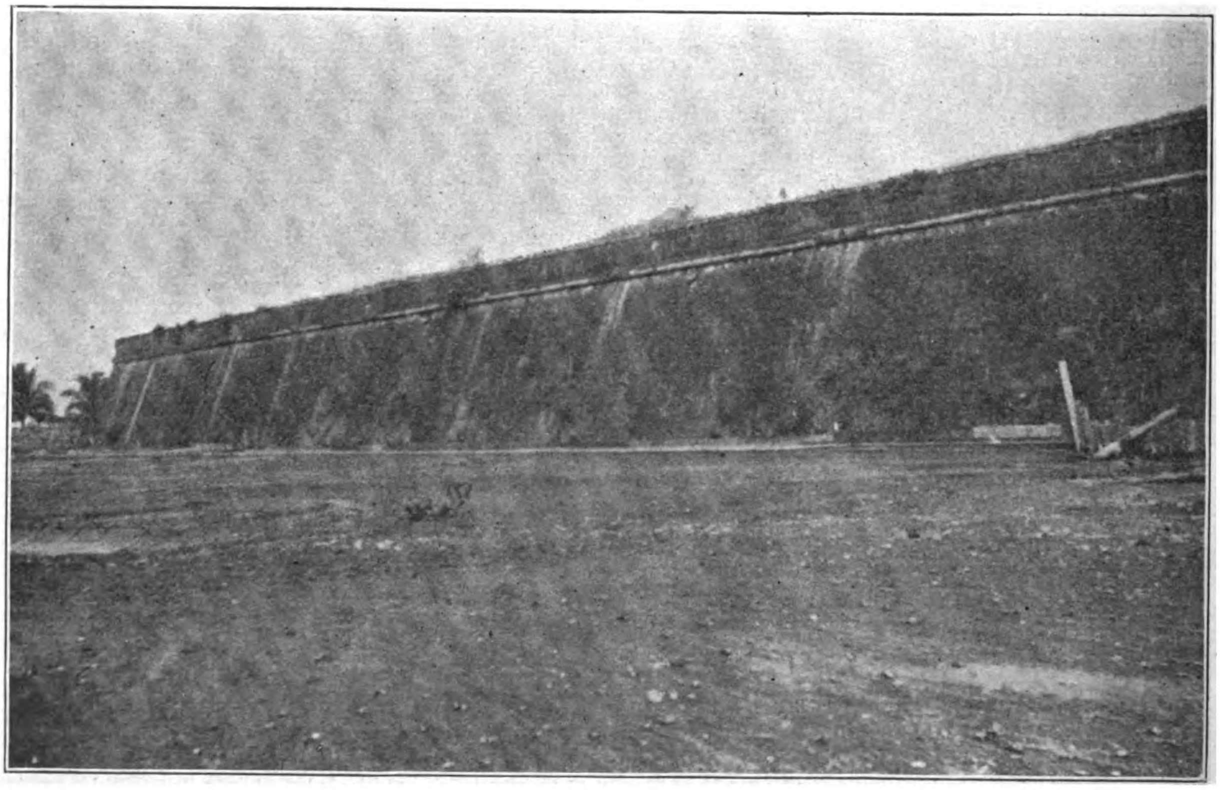
Or ₱9.89 per square meter.

Three hundred thousand two hundred and eighteen blocks were purchased at ₱92.78 per 1,000 and 336,588 at ₱79 per 1,000. Ten per cent should be added to this price, however, to cover the price paid the Insular Purchasing Agent.

The following statement shows the cost of installing cement curbing and sidewalks on Calle Rosario, Plaza Moraga, and the Escolta:—

Cost of installing 2,033 linear meters of cement curb	₱7,424.73
Cost of installing 3,969 square meters of cement walks	12,441.58
Total	19,866 31

The abutting owners paid the city at the rate of ₱3 60 per square meter for installing the cement walks, or a total of ₱12,516.12. Includes removing China stone walk and excavation.



SECTION OF FILLED MOAT

VIEW OF ESCOLTA EARLY IN 1904

Wood Block Paving on Plaza Cervantes Including a Portion of Calle Anloague:—The following statement shows the cost of removing the old granite-block pavement, resetting curbs, and laying the wood-block paving on a concrete base:

125.4 linear meters curbing reset, at ₱2 60 per linear meter	₱326.16
Removing granite blocks and preparing foundation over 1,922 square meters, at ₱0.47 per square meter or ₱1.58 per cubic meter (4,200-foot haul for round trip)	911.15
Laying 1,922 square meters 6-inch concrete foundation, at ₱1.42 per square meter 1:2½:5	2,726.74
Furnishing and laying 1,922 square meters wood blocks (labor laying, ₱0.55; cost of blocks, ₱4.72 per square meter; mostly 8-inch blocks, ₱0.543 per square meter)	10,122.41
Sand cushion and top dressing, at ₱0.12 per square meter	238.50
Pitching 1,922 square meters, at ₱0.38 per square meter	738.39
Total	15,063.35

364.46 square meters of cement walk was also installed on Plaza Cervantes for which the abutting owners paid at the rate of ₱3.60, or ₱1,312.05.

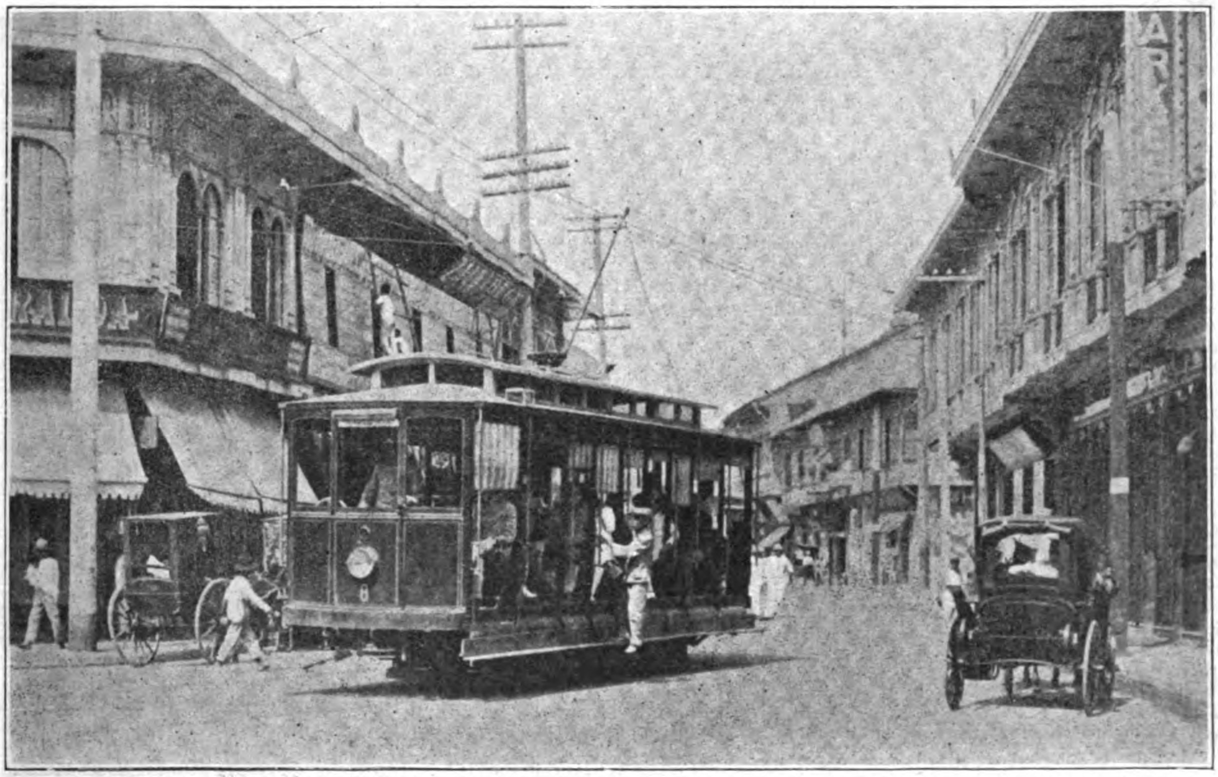
The work of laying a wood-block paving on a concrete base was performed by this department.

The following statement gives a comparison of the relative cost of the block paving laid in Plaza Cervantes by the city and the block paving laid in Rosario and the Escolta by J. G. White & Co.:—

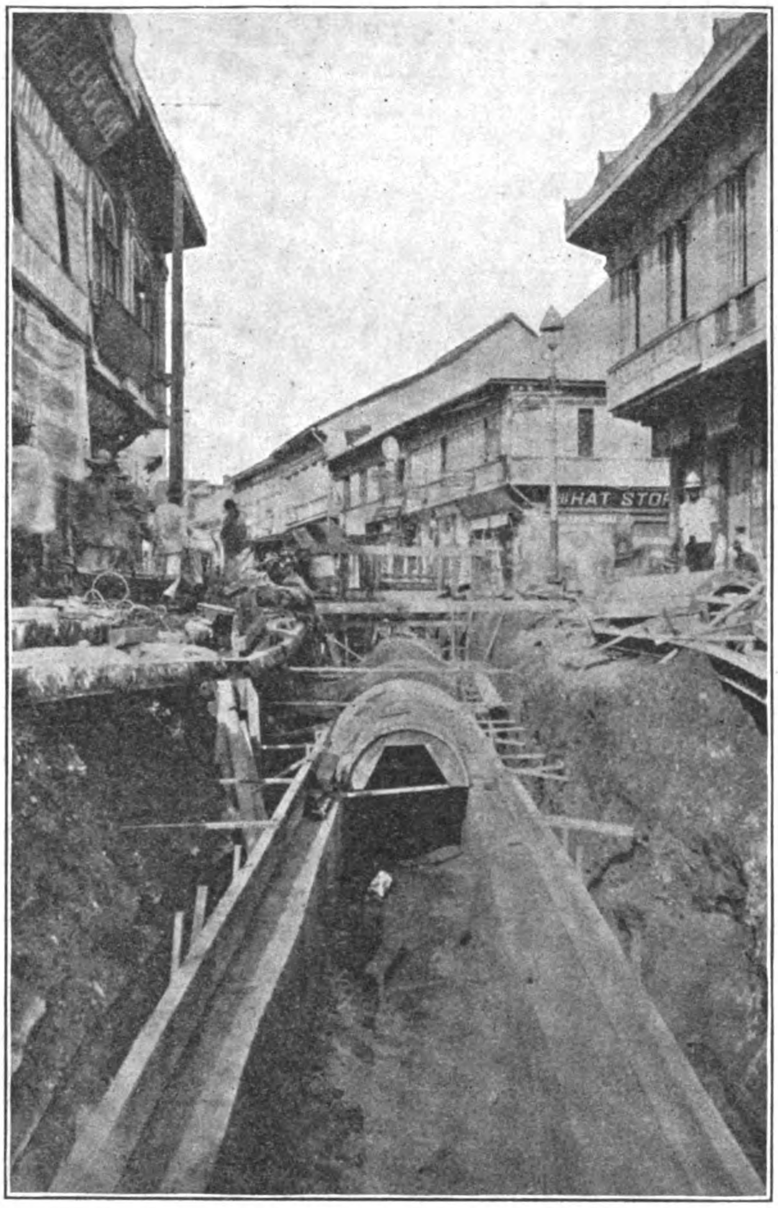
Plaza Cervates:	Per square meter.
Preparing foundation, at ₱1.58 per cubic meter	₱0.47
6-inch concrete foundation	1.42
Wood blocks (₱0.543 per square meter, at ₱79 per 1,000, plus 10 per cent)	4.72
Laying	55
Sand cushion	12
Pitching	.38
Total for completed pavement	7 66
Rosario and Escolta:	
Foundation, at ₱2.65 cubic meter	59
Concrete foundation	2.20
Wood blocks, 57.4 square meters	5.95
Laying	1.15
Total for completed pavement	9 89

All wood blocks in Plaza Cervantes cost ₱79 per 1,000, plus 10 per cent for Purchasing Agent charges. In Calles Rosario and Escolta 300,218 blocks cost at the rate of ₱92.78 per 1,000.

Length of Streets.—The length of streets within the city limits is now approximately 146,111 linear meters, or 90.7 ms. The pavement



VIEW OF ESCOLTA APRIL 15th, 1905, SHOWING MANILA ELECTRIC RAILROAD AND LIGHT COMPANY CAR



SEWER CONSTRUCTION, ESCOLTA

consists of wood block, granite block, and macadam, apportioned as follows:—

	Square meters
Wood blocks	17,432
Granite blocks	3 7,679
Macadam	1,299,014
Total	1,354,125

Prison Labor.—A force of 75 prisoners was employed during the yr. for removing a portion of the old wall back of the Intendencia building, for loading wagons with broken stone, for removing the retaining wall around the moat, and for various street works. The guard consisted of two American and six native police. One American foreman, one native foreman, and one tool man was the force required to handle these prisoners to advantage. All prisoners used were short-time men with only from 1 to 6 mos.' term, and therefore could not be worked as well as longtime prisoners. The reason for this is plain, for it will be seen that a prisoner's term would expire just about the time he was becoming familiar with the work, which necessitated the continual breaking in of new men.

The prisoners commenced work at 7 o'clock and worked till 11.30. They were allowed 2 hrs. for dinner and then started in at 1.30 and worked till 4 o'clock.

The amount of work performed by one street laborer per day equals the amount which three prisoners will perform in the same length of time. The difference in the amount of work performed is due to the fact that a prisoner shirks every chance he gets. He has no interest in the work and it is almost an impossibility to make him perform an average day's work. The best results were obtained in removing the old city wall along the Pasig River to make room for the new city docks. The maximum amount of labor was obtained on this work, as it was possible to handle the prisoners within a smaller area than on other classes of work. In contrast to the above work may be mentioned the grading of Dee Street. On this work the prisoners were stationed along the street for a distance of 300 meters, and it was found almost impossible to handle them to advantage. During the yr. 15,361 cubic meters of stone was removed from the old city wall and from the retaining walls around the moat for use in street work.

Steam Road Rollers (cost of operating per day equals ₱11.23.)—The three road rollers have operated 115 days each during the yr. Each roller was overhauled at the city shops, the boiler tested, and the engine put in good condition. Value of unexpendable material issued to rollers during the year equals ₱391.56.

The following statement shows the cost of operating the three rollers for the fiscal year ended June 30, 1905:—

Labor	₱5,779.00
Coal, 262.3 tons; oil, waste, etc	3,841.12
Repairs	998.38
Total	10,618.50

City Quarry. (Located on the Island of Talim, Laguna de Bay.)—The output of the quarry for the fiscal yr. 1905 as compared with the fiscal yr. 1904 increased from 33,045 cubic meters to 49,211 cubic meters. One new No. 6 Gates crusher was installed to replace the Blake and Austin crushers which had become worn out. The two Gates crushers when working 9 hrs. per day are able to crush approximately 400 cubic meters of stone.

BRIDGES.—The first pier on the S. side of the Bridge of Spain was partly carried away by the flood of July 13th and 14th 1904. The masonry was washed out along the face of the pier for nearly ⅔ of its length and into the pier for about 12′ and for a depth of 25′. This necessitated closing the bridge, foot traffic only being allowed to pass on the west side. The work of building a cofferdam preparatory to repairing the pier was commenced July 14th and carried on night and day until completion. The cofferdam was completed August 1st and the water pumped out. A great deal of trouble was experienced, however, before the dam could be made tight, as the water seeped through from the bottom of the river. The leaks were finally stopped and 475 cubic meters of concrete installed in rebuilding the pier.

The total cost of the repairs, including repairs and examination of the adjoining piers by a diver and the rebuilding of a portion of the retaining wall adjoining the bridge, amounted to ₱14.671.87.

J. G. White & Co. repaired the foundation and the arch to the Jolo Bridge in connection with the repairs to their portion of the bridge for the street cars. The cost of the repairs, outside of the track area, and which was paid by the city, amounted to ₱4,329.50.

General Repairs made to bridges during the year:—

Location.	Class of repairs.	Cost.
Santa Cruz Bridge over Pasig River	Scraping and painting.	₱2,465.67
San Andres, Malate	Repointing and facing up wall	317.95
Jolo Bridge	Building guard rails	420.10
Ayala Bridge	Repairs to floor and ironwork	872.13
San Antonio Abad Bridge	Repairs to arch	795.45
Bridge of Spain	Building new walk (523 square meters sidewalk and 261 linear meters curb)	5,682.88
Blanco Bridge	Raising walks	1,608.42
	New bridge, 60 by 16 feet, of Oregon pine	751.66
Pandacan Bridge	Cost of minor repairs on 55 bridges and 17 culverts, including an inspection of all bridges within city limits	10,756.27
Total		23,671.53

Dredging Esteros.—The work of dredging the Binondo Canal from the Blanco Bridge to the Jolo Bridge so as to give a depth of 1 meter at low water was commenced in December and completed in May. The material removed amounted to 6,456 cubic meters and cost ₱4.341 55, or an average of ₱0.67 per cubic meter placed on the bank of the estero. This cost includes all repairs made on the dredge, some of which were alterations that should be figured over a longer period than the one in which the dredge was in use. The actual cost of dredging in mud (excluding the general repairs referred to) and placing the material on the banks of the estero amounted to ₱0.27 per cubic meter. The cost of dredging in clay and gravel ranged from ₱0 63 to ₱1.05 per cubic meter. The cost of loading and hauling this material for a distance of a mile for filling on streets amounted to ₱1.36 per cubic meter, or the cost of the material in place, including dredging, amounts to -P-1.99 per cubic meter. The most important estero, after the dredging is completed in the Binondo Estero, is the Reina Estero. By dredging this estero it can be made the main line of communication with Tondo from the bay. The country adjoining the estero is sufficiently low, so that all the dredged material can be used for filling and thus reduce the cost of handling the material to a very low figure. It is proposed to use the city dredge in this estero during the coming year, and by using the dredged material for filling it will be possible to remove 100 cubic meters per day.

Blanco Bridge Wood-Block Paving on 6-Inch Concrete Foundation.—The following work was performed during the mos. of January and

PASIG RIVER WALL CONSTRUCTION, REAR OF INTENDENCIA BUILDING; THIS WALL HAS BEEN COMPLETED

February:—Total area paved, 446.69 square meters, at a cost of ₱3,573.34 or ₱8 per square meter. The item of cost per square meter is as follows:—

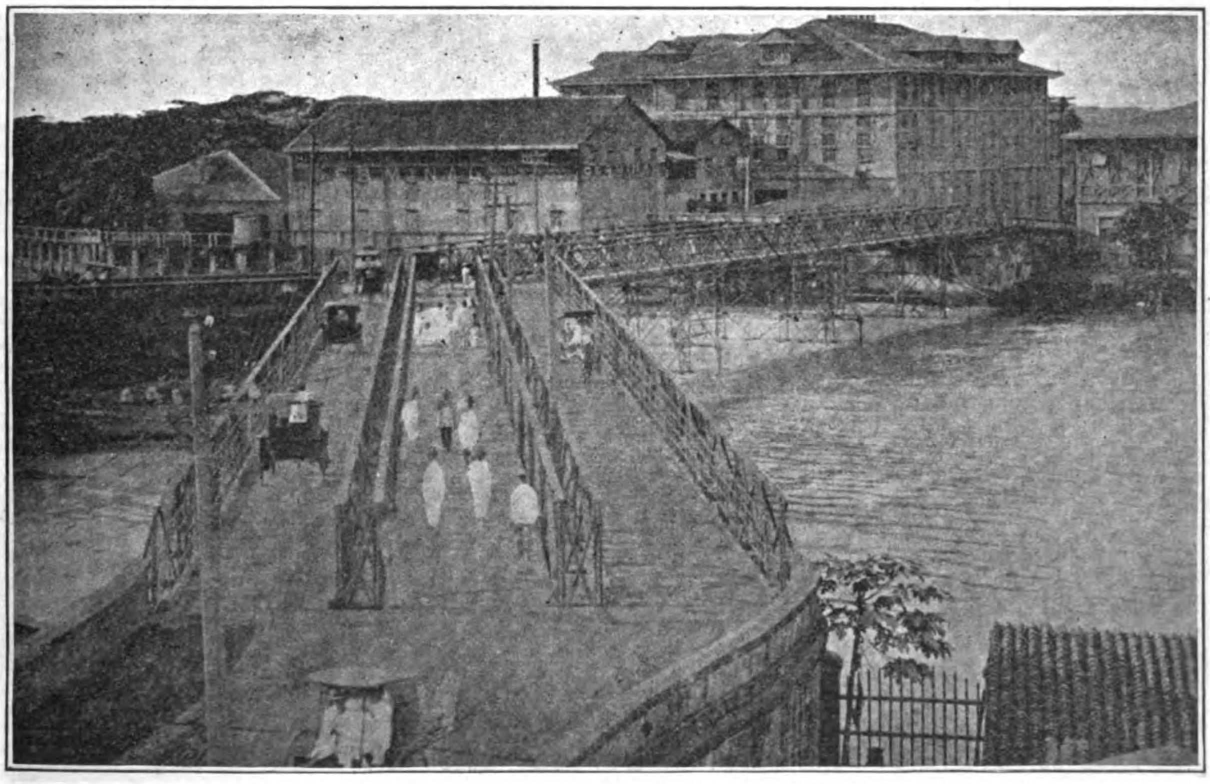
	Per square meter.
Preparing foundation, at ₱1.58 cubic meter	₱0.40
6-inch concrete foundation (1:2½:5)	1.32
Wood blocks (62 per square meter)	5.39
Laying	45
Sand cushion	.09
Pitching	.39
Total for completed pavement	8.00

Earth Filling.—The following contracts for filling streets were completed during the year:—

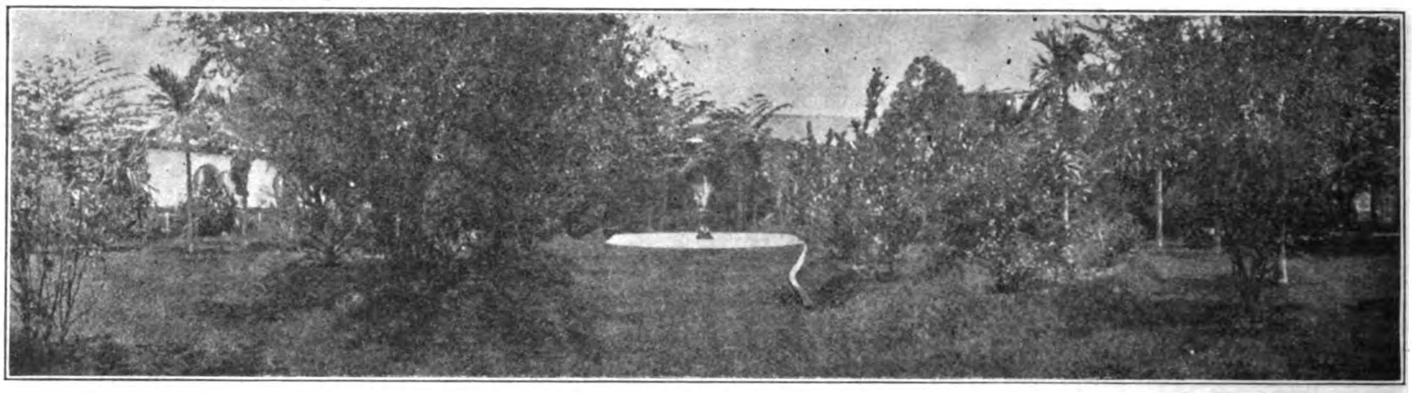
Location.	Contractor	Cubic meters of filling.	Price per cubic meter	Total cost
K Street	Lack & Davis	3,572 50	₱1.20	₱4,287 .00
K Street	Reich & Rosenburg	4,841	1.50	7,261 .51
San Lazaro	S. M. Berger	5,495.65	2.00	10,991.32
Total				22,539 .83

Electric Railroad Construction --The excavation and changing of grades in connection with the installation of 30 ms. of track for the new electric road increased the work on the streets where these tracks were laid to such an extent that all work in other streets had to be abandoned. In some of the streets in Tondo the grade was raised very near a meter, necessitating a large outlay for filling and resurfacing before these streets were made passable. In most every istance the depth of road metal was not over 6 ins. The reason for this light coating of stone was due to the necessity of making each street passable in the shortest possible time and to the lack of broken stone, owing to the large amount of work on hand. It is proposed to go over each of these streets during the current yr., excavate the material to a depth of 40 centimeters, and install road material in place of the softer material excavated. It has been found that this depth of material, although costing more in the first place, is more economical in the end.

Permanent Paving.—The enormous expense of maintaining a macadam road on some of the streets having heavy traffic makes it imperative that some system be adopted whereby a certain amount of permanent paving shall be installed each year. When it is realized that the cost of maintaining a macadam roadway in such heavy traveled



OLD AYALA BRIDGE, WHICH IS NOW BEING STRAIGHTENED BY THE ATLANTIC, GULF AND PACIFIC COMPANY AT A COST OF ₱129,726 TO THE CITY



LAWN AT PUMPING STATION, SANTOLAN

streets as Calle Echagüe amounts in 6 yrs. to a sum sufficient to install a wood-block paving on a concrete base, whose minimum life will be not less than 25 yrs., the necessity of such a pavement as a sound investment is apparent. A permanent paving will practically do away with the mud nuisance, the cost of cleaning will be reduced 50 per cent, and the paving from a sanitary point will be greatly increased in efficiency. The cost of installing the permanent paving on the main streets of the city having heavy traffic will amount to approximately ₱500,000. It would seem that the best method of providing funds for this work would be to issue paving bonds in a similar manner to that used in providing funds for the water and sewer construction.

Classification of salaries and wages of street construction and bridges for the fiscal year ending June 30, 1905:—

Classified employees.

Month.	Street construction.	Bridges.	Quarry.	Launches.
1904				
July	₱1,866.66	....	₱200.00	₱880.00
August	1,894.00	₱200.00	200.00	880.00
September	2,010.00	200.00	200.00	580.00
October	2,370.00	200.00	200.00	880.00
November	2,210.00	200.00	200.00	812.00
December	2,197.66	200.00	200.00	832.00
1905				
January	2,073.34	200.00	200.00	870.00
February	2,497.76	200.00	200.00	880.00
March	2,291.98	200.00	200.00	880.00
April	1,785.66	200.00	200.00	880.00
May	2,094.44	200.00	200.00	880.00
June	1,940.00	200.00	200.00	880.00

1904					
July	₱13,220.75	₱3,067.00	₱3,696.50	₱5,297.90	....
Aug.	15,280.25	3,764.00	4,291.00	4,653.50	....
Sept.	13,610.75	6,694.45	3,904.50	3,959.00	....
Oct.	11,612.35	1,976.20	4,977.00	3,924.50	....
Nov.	11,148.55	1,255.20	3,378.10	3,768.00	....
Dec.	11,777.45	1,682.20	3,827.80	3,988.10	₱226.00
1905					
January	9,567.00	1,972.40	3,591.60	3,909.60	313.50
Feb.	8,532.15	1,749.30	3,374.40	3,556.80	284.80
March	9,676.70	1,766.30	3,815.90	3,972.60	326.20
April	8,028.80	1,083.40	3,067.80	3,870.00	308.00
May	8,589.95	958.90	3,374.40	3,938.70	334.60
June	8,262.98	960.45	3,309.90	3,959.40	339.60
Total	128,307.68	26,929.80	44,608.90	48,798.10	2,132.70

Classification of general expenses street construction and bridges for fiscal year ending June 30, 1905:—

Cost of material obtained from Insular Purchasing Agent	₱140,465.02
Cost of hired transportation	52,420.01
Hire of diving apparatus, etc	1,537.50
Repairs to Jolo Bridge	4,329.50
Purchase of sand and gravel	22,335.18
Repairs launches, barges, road rollers, quarry, etc	17,706.52
Filling for K Street and San Lazaro	22,539.83
Total for general expenses	261,333.56
Total salaries and wages	291,051.28
Grand total	552,384.84

Includes purchase of paving blocks for Escolta, purchase of crusher, and purchase of miscellaneous tools and material for bridges.

Summary of work performed during the year:—

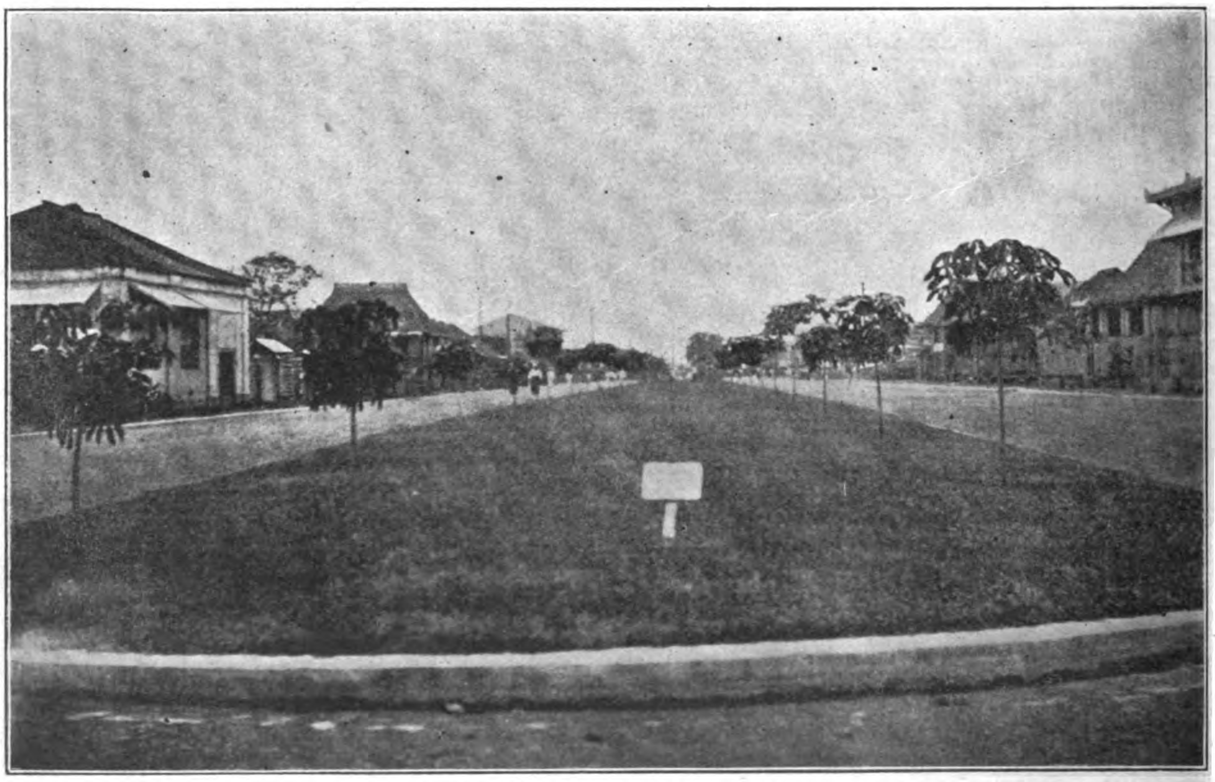
Streets resurfaced	square meters	₱282,523
Streets graveled	do	100,213
Streets patched	do	153,931
Block påving laid	do	6,192
Cement curb laid	linear meters	11,193
Gutters laid	do	31,713
Cement sidewalk, laid	square meters	10,708
Filling	cubic meters	31,010
Street signs made	number	360
Sidewalks, notice served	do	721
Perm itsissued	do	1,879
Broken stone from quarry	cubic meters	49,211
Gravel purchase by contract	do	19,479.06

FIRE OPERATIONS DURING FISCAL YEAR 1904-05, IN MANILA

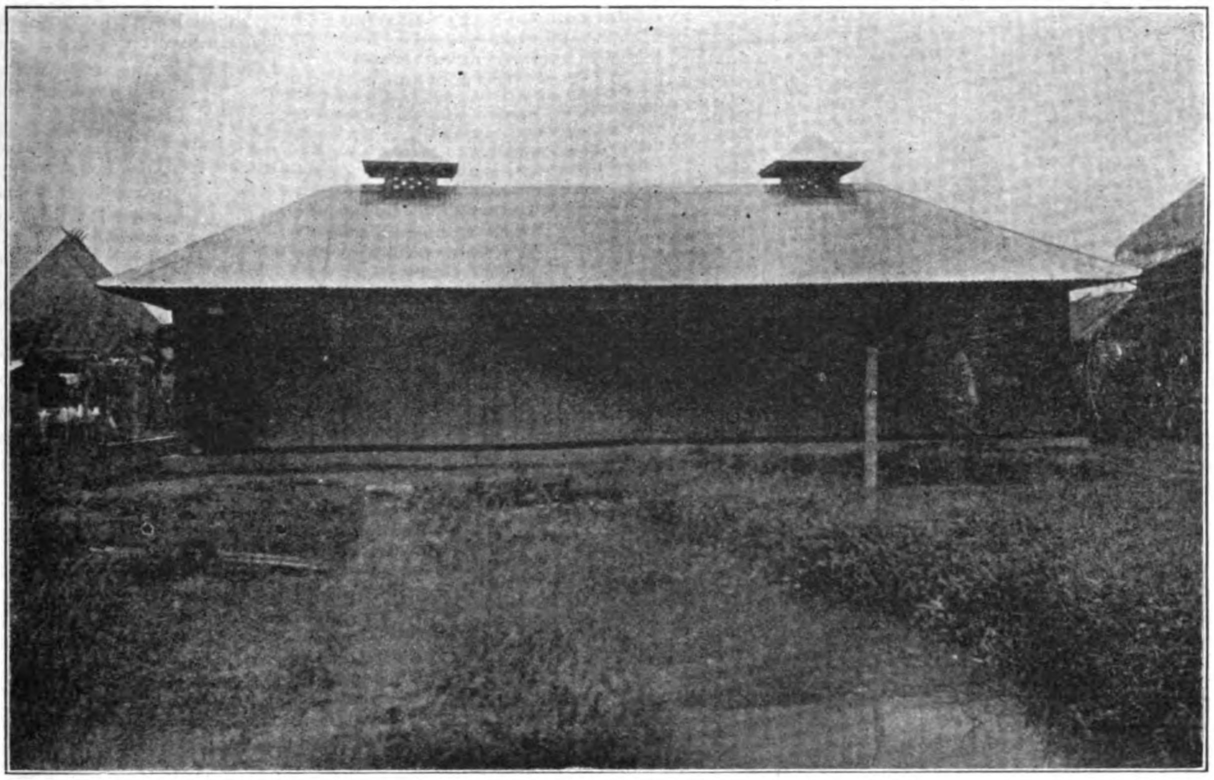
Mr. Lewis H. Dingman, chief of the Manila Fire Department, discusses fire operations in Manila during the fiscal yr. 1904-05 in his annual report to the Municipal Board.

During the yr. there were 132 alarms of fire, which is an increase of 31 alarms over the previous yr.

"It is a matter of regret," says Chief Dingman, "that, although there is a local association composed of the fire underwriters, it is impossible to obtain fire-insurance statistics of a reliable nature. The natives and a great many other owners and occupants of buildings burned show a great reluctance to give any information regarding the amounts of insurance carried and the losses adjusted. In a great



MORIONES PLAZA IMPROVED, 1905



A MIDDEN SHED

many instances the cause of fire can not be ascertained, apparently due to fear.

"A number of alarms were turned in by natives during the year, thus showing that they are becoming cognizant with the fact that the fire-alarm boxes are placed throughout the city for the protection of their property, and that it is not necessary to first notify a police patrolman. This is evidently due to the notices (printed in Spanish, Tagalog, Chinese and English) which the firemen keep posted in the residences. These notices give explicit instructions as to how to turn in an alarm from a box and also give the location of the box nearest their residence."

Mr. Frank Moffett, deputy chief of the department and city electrician, reports that the fire alarm system worked perfectly during the year. Fifty-five alarm boxes were installed and the location of 12 old boxes changed. The police alarm system has also given entire satisfaction. Twelve police boxes were installed and the location of 9 changed. One hundred and six additional boxes are now being installed.

NEW TELEPHONE SYSTEM, MANILA

Indications are that the new telephone system for Manila will be completed and in operation by September of the current year. Under the energetic and thorough-going supervision of its manager, Mr. H. Thurber, C. E., the Manila Construction Company has already practically finished the underground conduit work to conform to the first plans of the telephone company. The reinforced concrete central station will be ready for occupancy, it is expected, by March 1st, and then will commence the installation of the most complete and modern telephone-operating apparatus in the Orient. And in this connection a few details of this new enterprise may be interesting.

Early in March, 1905, Mr. E. C. Gee, a telephone engineer, arrived in Manila to make preliminary studies of a telephone and telegraph system to be installed in the City of Manila and the Island of Luzon. These studies proved satisfactory, a franchise was applied for, and in July, 1905, was granted by the United States Philippine Commission. Then a company composed of prominent San Francisco capitalists was formed, known as the Philippine Islands Telephone and Telegraph Company, and Mr. Gee was made general manager with headquarters in Manila. Mr. W. H. Gallaher, formerly telephone engineer of the Pittsburg (Pa.) Bell Company, was placed in charge of engineering and construction.

Taking advantage of the early mistakes made in the United States in such work, the new system was planned on a very broad and comprehensive basis. Studies were made showing the character of buildings in every city block, statistics gathered covering census records for many years past, and a carefully calculated rule adopted from which a close estimate could be made of the probable telephone subscribers in each city block in 1920. This done, it remained only to plan an ideal telephone plant to supply these prospective subscribers.

The company, at this point, faced a serious financial problem. Here was a city of 250,000 inhabitants, or more, containing only 500 telephones, or only one 'phone to every 500 people as against one to every six people in San Francisco and other Pacific Coast cities of the homeland. The question was, whether to build a medium-sized plant—say for 3,000 telephones—which might possibly have to be thrown into the junk pile in a few years, or to invest a large sum at once in a plant capable of expanding to the largest size. The latter course was chosen, and a plant begun which by simply building additional units can be enlarged to contain 30,000 telephones.

The telephone center, after the completion of the surveys, happened to fall right near the present postoffice, so a site immediately adjoining was leased for 50 yrs. from the insular government, and the contracts let for a commodious building large enough to house the "hello" apparatus for the ultimate of 30,000 instruments. The switchboard at the central station is to be the latest improved common-battery, lamp-signal style, manufactured by the Western Electric Company, and exclusively used by the Bell companies in the United States. This board is made up of units, these units being the largest size manufactured.

Considering the number of telephone contracts already obtained, a very extensive system of underground conduit proved necessary for efficient and reliable service. The vitrified clay conduit used in America was not available here, the freight, duty and breakage rendering the price prohibitive, so a contract was let to a local concern to manufacture 80,000′ of rich cement. These duct are laid in concrete in the usual manner, and standard manholes provided every 400′ or less. The underground cable is the standard dry-core, lead-covered, low-capacity cable of the most modern manufacture.

The pole question was a very serious one. Forestry laws and lack of transportation practically forbade the use of native wood, and almost all the ordinary woods of commerce are extremely subject to the depredations of white ants. These insects in 6 mos.' work on an 18″ spar of best Oregon pine will so ravage it that it will break of its own weight. The City of Manila, about 3 yrs. ago, installed a number of red cedar poles of special specifications brought from Puget Sound. These poles have, thus far, successfully resisted white ants, and as a consequence, this wood was adopted by the telephone company.

On account of typhoons, and for other considerations, the amount of open wire will be kept to a minimum, and short poles carrying lead-covered cable will be substituted.

LAST OF THE STEAMER "CARLISLE"

Reports from Saigon are to the effect that on January 3d fire broke out on board the steamer *Carlisle*, while she was lying at anchor in the Saigon River. The fire started in the No. 3 hatch where smokeless gunpowder was stored, and from there quickly spread to No. 4 hatch in which was stored the shells and explosives which the vessel took on board more than a yr. ago at Vladivostock for the Baltic Fleet. The shells exploded with terrific force and deafening noise, one report being so loud that it could be distinctly heard a distance of 10 ms. from where the ship was lying, and afterwards fragments of shells were picked up on the beach. After the explosions the ship settled down in the water and all that is now visible of her is the forecastle, the stern being entirely submerged. Of the crew all have been accounted for except the 2d engineer, but three others are in hospital suffering from injuries sustained. The heat of the fire was so severe that the members of the crew could not save their personal belongings. The vessel is a total loss being practically riddled with holes.

QUEER RAILROAD ENGINEERING

Some queer engineering practices have been indulged in throughout the Orient in the construction of railways, but none of them which have been brought to public notice surpasses in simplicity those adopted by the engineers who have "thrown together" the Sungei Ujong Railway, which traverses a route from Seremban to Port Dickson (formerly known as Lukut), in Negri Sembilan, Federated Malay States. The line was opened in July, 1901, and, according to one authority, "has greatly facilitated trade." Mr. J. S. Pasqual, however, forgets to say anything about "trade" in a description he writes of a trip he recently made over the road. He devoted himself almost exclusively to the engineering features of the line, and here is what he has to say:—

A few words about the S. U. R. (short for Sungei Ujong Railway) would not be out of place here, as it is one of the two main routes to Lukut. This line, about 25 ms. long, is owned by a company and is wavy, up and down, and curly. It is a moot point whether there are 149 curves on it or 150; but what is certain is that the curves are joined on one to the other like a lady's ringlets released from the curling pin, or, as the genial manager aptly puts it, "One good turn deserves another." You can't help knowing when the train is taking a curve by the way you are rocked about in the carriage. And well do I remember how I was once amused by the way two little boys kept racing from one side of the carriage to the other, according as it listed to port or starboard, in order to catch sight of the locomotive as it came into view in taking the starboard or port tack. It is not true that passengers sometimes have to get out and push the train up an encline, as, in point of speed, it compares favorably with other Federated Malay States railways, doing the 25th m. in 1½ hrs. As your fare costs $1.50, this works out at $1 per hr. only. Sometimes it works out at 50 cts. per hr. Then you have the comfort of knowing that you are getting your money's worth travelling—and sleep. The S. U. R. has good points. For instance, you are not told by a brass plate what to do in regard to the disposal of your lower anatomy with reference to the upholstered seat. Then again, you are not set rummaging your pockets and vocabulary by the guard at every station, in order to satisfy his insistent curiosity as to the color of your ticket, and whether he has sufficiently mutilated it with the pair of nippers he sports and snaps so perilously near your face. The S. U. R. guard knows better. There is one thing, however, you must not do on the S. U. R. and that is to leave the fore door of your carriage open, because the locomotive is a veritable spitfire, and is likely to treat you to a bigger display of fireworks than you care for. A notice to this effect is put up near the door.

The principle that must have guided the engineers when constructing the S. U. R. was apparently to follow the line of least resistance, and so avoid cuts and banks. The sight of a small hill was sufficient to send the line meandering all over the country in order to get to the other side of the hill. In the same way, it would loop an entire watershed to get to the other side of a gully, be it ever so small.

MINERAL RESOURCES OF KOREA

The London Board of Trade recently received, through the British Foreign Office, from Sir J. Jordan, K. C. M. G., minister at Seoul, a translation of the report of the Commercial Bureau of the Japanese Government on mines and mining in Korea. The following extracts from this report will indicate generally the mineral resources of the country, but Minister Jordan points out that the figures embodied in them are not in every case accurate:—

The mineral output of Korea may be considered to consist practically entirely of gold which is recovered both by placer or quartz mining. The number of places where gold is at present worked, either by placer or quartz-mining methods, amounts to over 120. The amount produced annually is about 121,000 ozs., of a value of some £450,000. Quartz gold appears most plentiful in Pyeng-An Province, the Wonsan mine being the most valuable in the country. The next in importance is the Eun san mine. Other valuable mines are the Chang-song and Tel-chon. Placer gold occupies the principal place in the products of the peninsula, and the mining districts are more widely distributed than those of the quartz mines. Of the total gold output of £450,000, the proportion of placer gold amounts to some £300,000, or 66 per cent of the total. The principal centers of placer mining are situated in Pyeng-An Province, the whole annual output of this province being about 48,000 ozs., of a value of over £150,000, or ⅓ of the total output of gold in the country.

In spite of the demand for silver in Korea, there is no native supply. There are, however, silver mines in the country. Experimental workings have been made, and it appears that there are undoubtedly silver deposits. Owing to the expense of working, however, they offer far more difficulty in working profitably than gold mines, and especially than placer gold.

Copper occurs chiefly in the N. and S. of the peninsula, and is rarely found in the central districts. The principal mine in the country is that of Kap-san, in Ham-Gyeng Province, which has a considerable output, amounting to some 270,000 lbs. of refined copper per annum.

Iron is found in Whang-Hai and other provinces, but the difficulty and expense of mining and smelting have hitherto precluded the Koreans from engaging to any great extent in this industry.

The future of the coal mining industry in Korea does not look promising; there are, however, coal deposits in several places. Of these deposits only that at Pyeng-Yang consists of smokeless coal all the others being bituminous, and though some of the deposits are of considerable extent, the quality is not very good.

Crystal is a famous product of Korea. It is found principally in Kyeng-ju, in North Kyeng-Sang Province, and is of excellent quality. Talc of excellent quality is found at Pyeng-hai, in Kang-Won Province, and in the neighborhood of Yee-Chun, in Kyeng-Kei Province, but it does not appear ever to have been worked.

PROPOSED NATIONAL HARBOR, JAPAN

That the Japanese are a far-seeing race is shown by the way they build for the future. The Japan *Chronicle* deals with the determination of the Japanese to have a large harbor that will rival Shanghai, Hongkong, or even large western cities. Mr. Takugaro, a leading citizen of Osaka, thinks it is time for Japan to move forward. He points to the work in the past of Europeans and Americans in building up trade on the Atlantic, and contends the same thing is possible on the Pacific. America, China, Japan, India, and Australia are the lands visibly interested in the era opening in the Orient and on the Pacific.

The country or countries favorably situated for trade, he says, are sure to be benefited by every movement forward. Japan is already doing businesss with the principal countries on the Pacific, and is eagerly looking forward to the time when it will be able to extend its trade into all parts of the world. To do this, it will need facilities for handling, forwarding, receiving, and transporting goods. Panama, Mr. Nakahashi thinks, is to be the leading port on the Pacific, followed in importance by San Francisco, Seattle, Vancouver, and Portland. No important port is possible on the South American Coast, for geographical conditions will not permit it. In Asia Hongkong, Shanghai, Osaka, Manila, and Dalny are to be the ports, and important in the order indicated. All of these are capable of being improved and doubtless will be as trade increases.

Discussing the relative advantages of the several principal commercial ports of the Orient, Mr. Nakahashi says:—

Manila will not, despite the desires and efforts of Americans, develop into a first-class tradal port owing to the fact that, apart from the torrid climate, it has neither factories of importance nor a large field for inland trade, while, as an intermediate port for China, Japan, or Korea, the distance is too great and fuel too dear. The same may be said of Dalny to a certain extent, with the only exception in its favor that as a terminus of a 500-m. railway mails and a certain class of travelers will pass through the place. But so long as railway freight can not successfully compete with steamships, and eastern Siberia and northern Manchuria remain more densely populated than southern Manchuria, Dalny will remain a second-class tradal port. It is therefore only Hongkong, Shanghai, and Osaka which possess qualifications that will enable them to develop into important commercial emporiums in E. Asia.

The shortcomings of Hongkong are that, being an isolated island, its scope is necessarily limited; it has no manufactures to speak of, while the sphere of island trade is confined to the neighborhood of Canton. Although Hongkong may continue a chief distributing center of European trade, its position is not suited to be a large mart for Pacific trade in the future. Shanghai is better situated than Hongkong in having millions of people in the Yangtsze Valley, many factories in its vicinity, while it has a favorable position as an intermediate station. Its only weak point is that the harbor is not as deep as it should be for a large commercial port, and this fact greatly discounts the possibility of its becoming a port of much greater importance than at present.

Osaka, on the other hand, not only is situated on the highway of the world's commerce, but its position is unique as a distributing center for China, Korea, and the South Sea Islands. It possesses within easy reach many factories turning out articles for export, while in the matter of domestic trade it covers an area containing two-thirds of the total population of the country. For fuel the coal fields in Kyushu will give a practically unlimited supply across the water some two hundred and odd miles in extent. Osaka has already laid the foundation of becoming a great harbor, and if the breakwaters are farther extended so as to keep a depth in the harbor of 35′ it will become a port possessing as nearly as possible all the essential elements of a large commercial emporium in the Pacific.

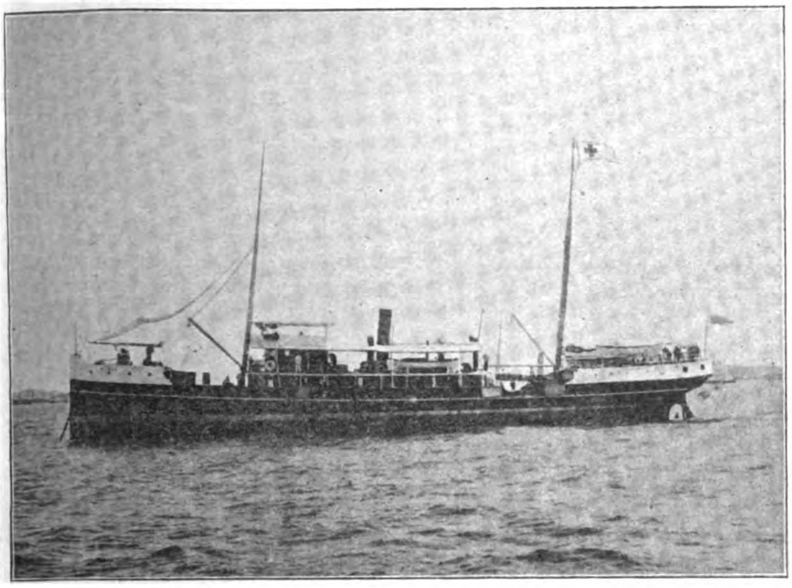
PHILIPPINE MARBLE AND CLAY

Marble, or crystalline limestone, occurs in the Islands of Romblon and Mindoro, and probably elsewhere in the group. This is a gray-blue mottled marble and much of it seems very suitable for decorative use. White crystalline marble has also been found in Mindoro, in considerable quantity.

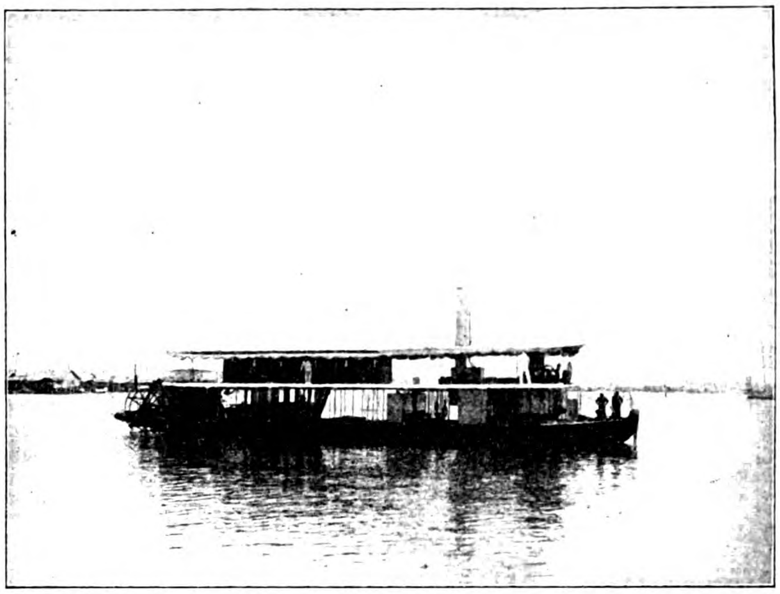
White clays, or kaolin, have been found in the Provinces of Abra, Camarines, Ilocos Norte, Antique, Benguet, Cagayan, Isabela, Laguna, Marinduque, Masbate, Pampanga, Pangasinan, Albay, Romblon, and Zambales. The suitability of these for the manufacture of porcelain and china is now being investigated. Red clays, from which natives make large amounts of pottery for local use, are found in almost every province in the Islands. Fire-clay has been found in the coal beds, and may afford a profitable industry in the future. Red bricks are made in large quantities in Bulacan, Capiz, Rizal, Ilocos Norte, Isabela, Marinduque, Masbate, and Pampanga.

Messrs. Riley, Hargreaves & Co., Ltd., Singapore, S. S.

In this connection THE REVIEW presents some fine illustrations herewith of vessels that have been turned out at this shipyard.



PASSENGER AND CARGO STEAMER *PERAK* (90 A-1 AT LLOYDS), BUILT FOR CHINESE OWNERS; LENGTH 164′; CARRYING CAPACITY 570 TONS D. W., PASSENGERS 1ST CLASS 14, 2D-CLASS 32, 3D-CLASS 155



STERNWHEEL STEAMER *OGAN*, BUILT FOR THE "KONINGKLIJKE PAKETVAART MAATSCHAPPIJ"; LENGTH OVER ALL 100′; DRAUGHT OF WATER 1′ 10″; CARRYING CAPACITY 26 TONS D. W., BURNING OIL FUEL

Among the old-established and successful electrical, mechanical, and civil engineering firms of the Far East, that of Messrs. Riley, Hargreaves & Co., Ltd., of Singapore, S. S., holds a foremost place. The head offices and works of this concern are located in Read-st, while its town store occupies spacious premises at 13 Battery-rd, Singapore. The firm also has a branch at Ipoh, Perak, Federated Malay States, and is widely represented throughout these states and Netherlands India.

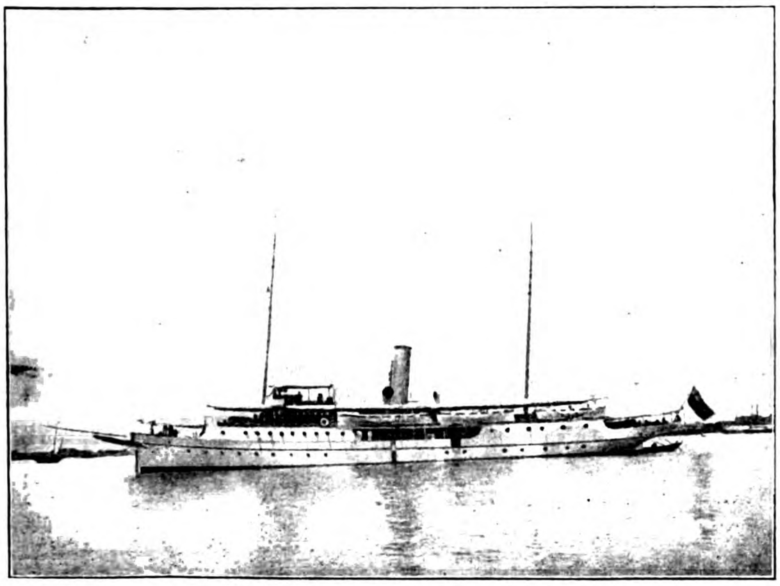
Messrs. Riley, Hargreaves & Co. carry on, besides their general contracting business, boilermaking, iron and brass foundering, and bridge and shipbuilding on an extensive scale, besides being general contractors to the governments of Great Britain (Colonial), Netherlands India, and the United States of America.

The managing director of Messrs. Riley, Hargreaves & Co. is Mr. W. M. Robertson, better known or more universally esteemed than whom there is no other gentleman in the engineering and contracting business of this part of the globe. Under his able direction the firm has grown to be one of the best dividend-paying concerns of the Straits Settlements.

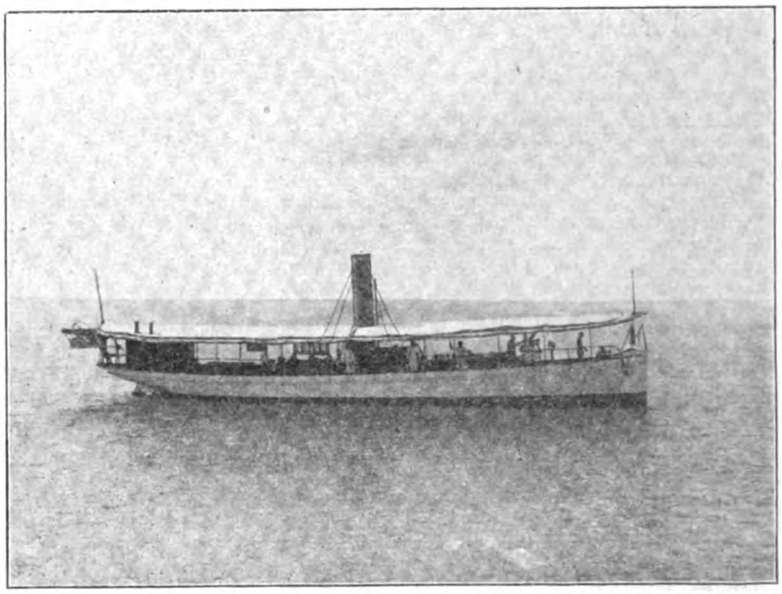
Messrs. Riley, Hargreaves & Co.'s engine works, boiler shop, and foundry are located at Kampong Malacca. The machine shop includes all sizes of lathes, planing, and shaping machines; boring, screwing, slotting, and milling machines; cold iron saws and other machines, and is capable of executing the largest orders promptly and on a moderate scale of prices. The boiler shop is a new, large, and commodious addition to the plant, and is fitted with all the most modern heavy machinery for turning out 1st-class boilers, tanks, bridge and girder work, and pipes for hydraulic mining, for the last named of which there is a constant and increasing demand. The foundry is equipped for a large output of light and heavy, plain and ornamental castings in loam, green sand and dry sand. Special facilities are provided for turning out house and godown columns and beams, bridge cylinders and heavy mill gearing, while castings in brass, copper, bronze and bell metal are also among the products.

The firm's shipbuilding yard is located at Tanjong Rhoo, and here fine vessels are built under Lloyd's and the London Board of Trade surveys, and speeds are guaranteed. The yard is provided with large engine and machine shops and building sheds. The machine shop is fitted with powerful punching, shearing, bending, plate rolls, and plate bending and planing machines; plate and bar furnaces, and bending blocks, and is adapted for shipbuilding in steel, iron, composite or wood. Like all other departments the shipbuilding is carried on under skilled European supervision, and the firm is prepared to furnish full drawings, designs, and estimates for all kinds of steam vessels.

In their electrical department Messrs. Riley, Hargreaves & Co. handle continuous and alternating current machinery of every description, together with dynamos, motors, arc lamps, instruments, switchboards, etc. They also manufacture steel bridges of all classes, piers, lighthouses, land and marine engines and boilers, the "Victor" centrifugal pump, mining machinery of all classes, oil boring gear, boring tools, pug and mortar mills, brickmaking machines and presses, and watercarts, roadrollers, etc., as supplied to colonial and native states governments and municipalities.



STEAM YACHT *SEAMEW*, BUILT FOR THE GOVERNOR OF THE STRAITS SETTLEMENTS; LENGTH 197′; SPEED 12 ½ KNOTS



STEAM LAUNCH *IDRIS*, ONE OF SIX OF THIS CLASS OF VESSELS BUILT FOR THE GOVERNMENT OF THE FEDERATED MALAY STATES; LENGTH 72′; SPEED 10 KNOTS

STEAMER *CONSTANTIJN* UNDERGOING REPAIRS ON MESSRS. RILEY, HARGREAVES & CO'S SLIPWAY AT TANJONG RHU; LENGTH 107'; GROSS TONNAGE 188

The town store in Singapore contains a large stock of engineering, shipbuilding, and house building tools, materials, and stores. Steamers can be fitted out to pass Board of Trade survey with lamps, life buoys, and belts; rockets, blue lights and other signals, stamped with date of manufacture. Mining companies can be supplied from stock with boring tools, and all kinds of mining and pumping machinery. Rock drills, picks of all kinds, ore dishes, etc,; planters' changkols, parangs, spades, axes, etc., are always kept in stock and can be supplied in any quantity.

JAPANESE PROGRESS

United States Consul Sharp, of Kobé, contributes a very interesting report on various industrial enterprises that are active in Japan, most of which will shortly become competitors of similar establishments in America and Europe. He writes:—

Cotton yarns.—The spinning industry is well developed in this consular district, and cotton yarns form the principal article of export. In 1903 the daily average of working spindles was 897,119, and the output of yarn amounted to 233,789,301 lbs. Besides supplying the domestic demand, yarns to the value of $12,474,074 were exported from Kobé and Osaka in 1904, mostly to China and other Asiatic countries. No. 16 is the grade mostly exported, but Nos. 12, 14, 20, 22, and 32 are also shipped in considerable quantities.

Cotton textiles.—This industry is not yet so important as the spinning, but it is growing rapidly, and great varieties of goods are turned out. It is stated that there were 7,517 power looms and 212,211 hand looms in operation in 1903 in this district. Ten large mills in this neighborhood, operating an average of 4 640 looms in 1903, produced 76,702,213 yds. of goods. In the first half of 1905 these same mills had 5,711 looms working and produced 52,345,742 yds. Among the textiles manufactured are gray shirtings, sheetings, drills, cotton sail duck, cotton flannel, T cloths, muslins, towels, and blankets. The domestic consumption of all these goods is large, and the exports at Kobé and Osaka amounted in value to $3,937,059 in 1904. The exportation of towels alone amounted to $681,255. These goods are sent mostly to Asiatic countries. There is also a considerable manufacture of knitted goods.

Clothing.—In connection with the cotton textile industry it is worthy of note that a large quantity of clothing and underwear is made here, exports of the latter at Kobé and Osaka amounting in value to $669,106 in 1904. The importation from abroad of shirts, collars, etc., has become insignificant owing to the development of domestic manufactures.

Carpets.—Cotton, wool, and hemp carpets to the value of $245,581 were exported from Kobé in 1904. A very creditable carpet is made here and is largely used.

Clocks and watches.—There was formerly a considerable market for foreign clocks in Japan, but now most of the cheaper kinds are made in Japan. There are large factories in Osaka and Nagoya, and even watches are turned out, though sometimes made largely from imported parts. The value of clocks exported from Kobé and Osaka in 1904 was $181,508.

Umbrellas.—European umbrellas are also made in this district on a large scale. Besides supplying the greater part of the amount required by the large and growing local demand, they are exported, principally to Asiatic countries, the value of shipments from Kobé and Osaka in 1904 being $603.707. While the ribs for the more expensive umbrellas are imported from abroad, those for the cheaper grades are made here. There is also some importation of material for covering them.

Glassware.—Window glass, mirrors, and glassware of all kinds are now manufactured in this district, and in 1904 were exported from Kobé and Osaka to the value of $509,747. It is only a few years since that the supply of sheet glass came entirely from abroad, and it was thought that the article could not be manufactured in Japan. At present sheet glass, little inferior to that imported, is not only manufactured in Japan but exported to China, India, and Burma. The principal glass factory in Japan is the Shimada Glass Works, of Osaka, which employs about 400 operatives. The glass made by this factory has obtained a good reputation in China and India, and the government is doing what it can to encourage the industry by using Japan-made glass in its buildings.

Lamps.—Lamps and parts, such as burners, chimneys, etc., were formerly imported from the United States, but now all except some expensive or patented styles are manufactured in Japan and are exported to the neighboring countries. The development of glass manufactures has made the growth of the lamp-manufacturing industry much more rapid. The value of lamps and parts exported from Kobé and Osaka in 1904 was $244,225.

Cigarettes.—The government monopoly of course prevents the importation of manufactured tobacco, but in addition to having the domestic market to itself, it exports largely to Asiatic countries. The value of cigarettes shipped abroad in 1904 from Kobé and Osaka was $1,145,252. Paper mouthpieces, formerly imported from the United States, were exported to the value of $34,571 in 1904, of which about $12,000 represents mouthpieces sent to the United States.

Paper.—The manufacture of European style paper is well developed, and at present many newspapers are printed on paper of domestic make. The finer grades also are produced.

Machinery.—A great deal of the simpler kinds of machinery is already made in Osaka, and exports amounted to $285,609. Electric motors are manufactured in Kyoto and Osaka, but not over 17 h. p. ordinarily. Dynamos and other electrical appliances are also made in the district to a considerable extent. The majority of the locomotive engines are imported, but some are constructed here, usually with imported parts. Railway cars are made, the trucks being commonly imported.

Leather goods.—Shoes, and leather trunks and bags are manufactured in this district, and so cheaply that competition from abroad does not exist. The value of boots and shoes exported from Osaka in 1904 was $38,012.

Refined sugar.—This commodity has hitherto been imported on a large scale, but domestic refineries are being established in this district, as in other parts of Japan, and in time should supply the Japanese market. This will be of interest when the Philippines and Hawaii are considered.

Beer.—This beverage is made near Osaka and Nagoya. The domestic brew supplies the local market, there being, on account of the protective duty, scarcely any importation of foreign beer, though some ale, porter, etc., is imported. In addition beer valued at $228,462 was exported from Kobé and Osaka in 1904.

Soaps and perfumes.—These are manufactured in this district, and toilet soap valued at $141,926 was exported from Osaka in 1904. There is still a demand for the finer foreign soaps, but the market for them is naturally limited.

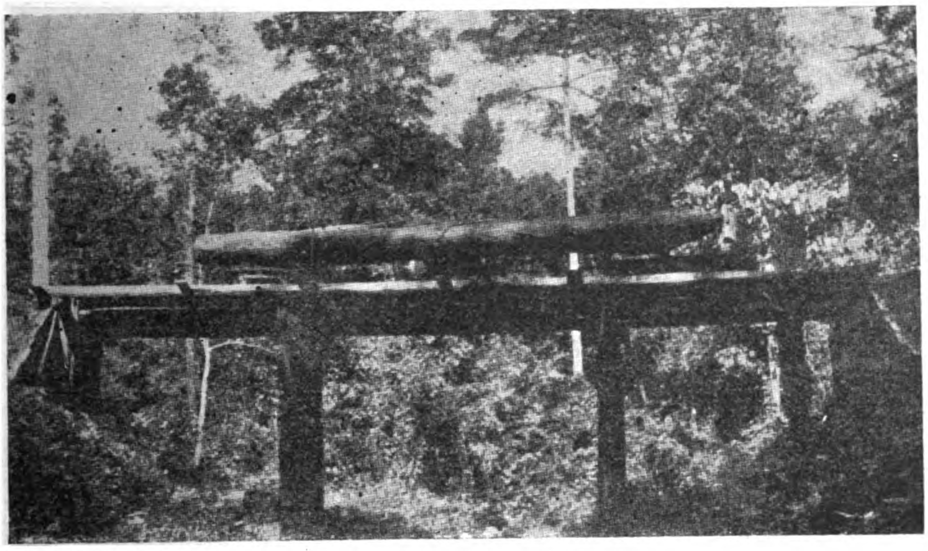
Other manufactures.—Surgical instruments, foreign musical instruments, builders' hardware, tools, stoves, crucibles, drugs, scales, hats, and caps are among the other articles formerly imported in large quantities that are now being made here, and, on account of their cheapness, though sometimes inferior in quality, they are supplanting the imported articles.

That Japan is likely to be active in checking the import of foreign goods which might compete with home industries is shown by the action taken by the chambers of commerce in Japan. It appears that the united chambers of commerce decided some time ago to intrust seven chambers in the country with the preparation of the draft of a new law for the protection and furtherance of Japanese industries, which is to be submitted to the diet. These chambers are said to have appointed special committees to report on the matter.

In the report of the Kobé committee it was recommended that the importation of goods which compete with home industries should be checked as much as possible. This is to be achieved by the raising of the statutory tariff and the abolition of the conventional tariffs or, if the latter measure be inadmissible, by the establishment of consumption taxes.

Cochin State Forest Tramway Built for the Madras Government

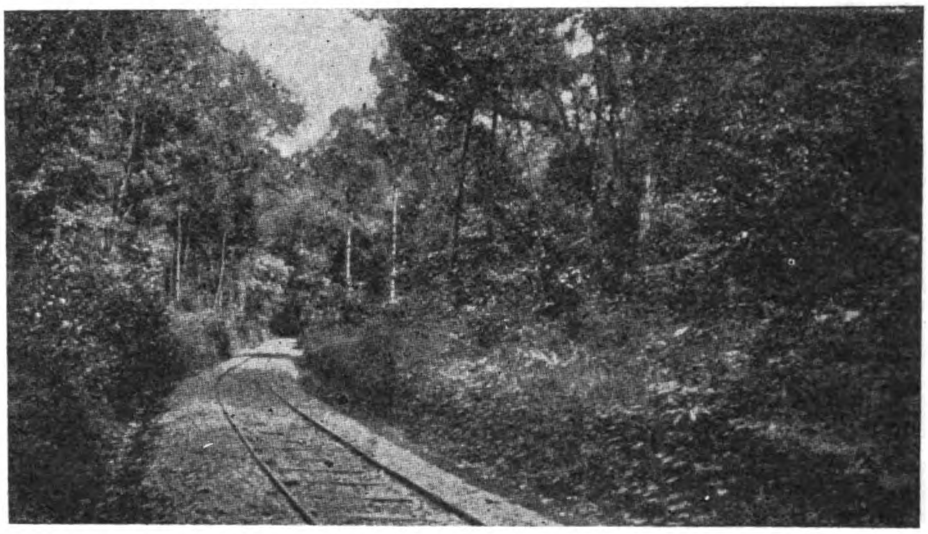
Lord Ampthill, Governor of Madras, recently formally opened this line. The scheme, according to *Indian Engineering*, is due to the foresight of the late Dewan of Cochin, who adopted the views of Mr. Alwar Chetty, the Conservator of Forests, in the matter, and gave practical effect to it by entrusting the work to Mr. R. E. Haffield, B. A., B. E., T. C. D., in 1900. This officer was connected with the line from start to finish, and much of the success already derived from it is due to his exertions.



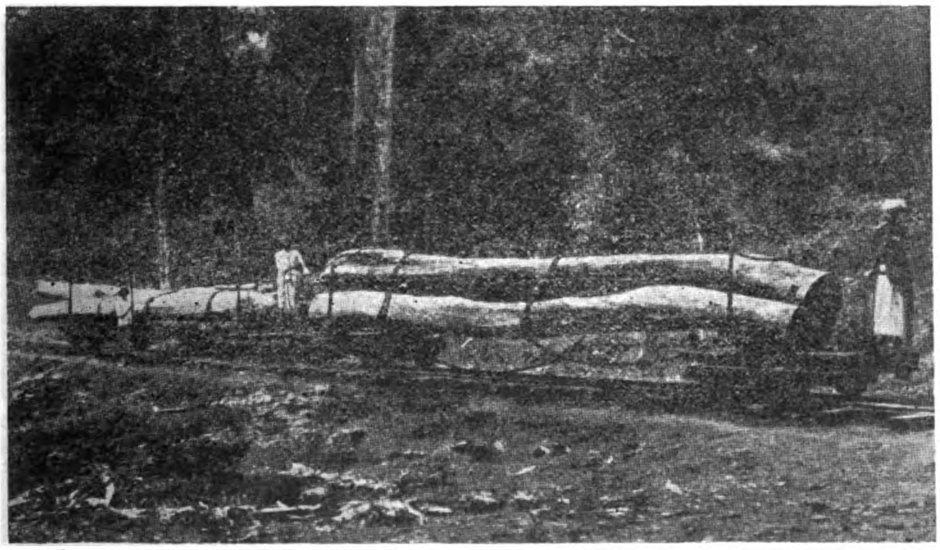
TYPE OF BRIDGE CONSTRUCTION

The Tramway is in three sections connected by two inclined tramways. The first section, from Parambikolam to Pothupara watershed, is 20½ ms. long; the second, from Pothupara to Thoppathikamalai, has a length of 4½ ms, and the third, from Anapanden or foot of Thoppathikamalai to Chalakudi, 19 ms. in length. The first section is connected with the second and the second with the third, by the inclined tramways, about 1 m. and 1½ ms. respectively in length. The total length of the line is thus a little over 46 ms. in length, and forms a connection with the Madras Railway.

The interior of the Cochin forests has an extent of about 300 sq. ms., of which nearly 250 sq. ms., are virgin forests full of fine, tall, well-grown teak and other valuable trees. Of this area, 127 sq. ms. have been constituted into a working-circle and are being worked on rotation. The tramway is the medium for transporting the timber collected from this area. It is estimated that the department will be able to collect and transport by the line to the place of sale at least 5,000,000 cub. ft. of teak, blackwood and hard junglewoods a yr. This can be done at a cost not exceeding Rs. 2,50,000, and the quality of timber so transported can be sold for at least Rs. 5,50.000. Thus the minimum revenue of three *lakhs* of rupees per yr. is anticipated.



STRETCH OF THE LINE, SHOWING SHARP CURVE



"BOGIE" WAGONS LOADED WITH LOGS

In the construction of the tramway the Calcutta branch of Messrs. Orenstein & Koppel, of Berlin, supplied in all about 50 ms. 20-lb. and partly 25-lb. flat-footed rails which are laid on the timber sleepers available on the spot, the gauge being 3′ 3⅜″ (meter gauge). The cars are *bogie* trucks of 6 tons carrying capacity each, or 12 tons per double-car *bogie*, and, on account of the heavy inclines, are fitted with strong screw brakes acting on all four wheels. Each *bogie* has a swivel bolster with hinged droparms, chains, and hooks, which ensure quick and safe loading and unloading of the heaviest logs.

The locomotives have 6-wheels-coupled and are specially built for wood fuel. These engines can haul 30 tons on a gradient of 1 in 50 and can pass curves of 150′ radius. All of them are fitted with hand as well as steam brakes and are built for a working pressure of 205 lbs. per sq. in.

The tramway has five self-acting inclines with working loads of about 12 tons each, actuated along gradients of 1 in 4 and 1 in 5, their lengths varying from 1,300′ to 3,000′ each. These inclines have also been supplied by Messrs. Orenstein & Koppel.

PHILIPPINE BUILDING STONE

The Philippine resources in stone for building and other construction work, and road metal, are almost unlimited. Among the hard, crystalline rocks, capable of standing heavy pressure, of resisting, weathering, and of taking high polish, should be mentioned the fine gray diorites of the Cordillera, found in almost every province upon the western slopes of the range, and in Paragua, the gray tonalites of quartz diorites of Tinagon and Colasi, Panay, equal to many of the best granites, and a rock, apparently a true syenite, or hornblende granite, recently found in Masbate. Augite-andesite is now being extensively quarried by the Atlantic, Gulf and Pacific Company, at Mariveles, for the works of the improvement of the port of Manila, and a volcanic tuff, soft when quarried but hardening rapidly upon exposure, is quarried in large amount and at good profit at Meycauayan, Bulacan, and Guadalupe, Rizal, and elsewhere, for building stone. This rock has been used in enormous quantity in the construction of churches and other buildings in the Philippines, and in the walls and fortresses of Manila. Crushed andesite has been extensively used in street work in Manila and has made excellent road metal. A large variety of the neo-volcarnic rocks have been used, in addition to gravel, for similar purposes, by the provincial supervisors, in the construction of roads.

FAR EASTERN ENGINEERING, CONSTRUCTION, COMMERCIAL AND FINANCIAL NEWS

PERSONAL

VISCOUNT AOKI has been appointed Japanese ambassador to Washington, and Mr. K. Inouye, minister at Berlin, has been promoted ambassador.

MR. H. E. HYDE, C. E., of the office staff of the City Engineer of Manila, has been promoted to 1st-Assistant City Engineer. The appointment dates from January 1st.

MR. ERNEST G. BRABROOK, Manager of the Far Eastern Department of The Link-Belt Machinery Company, of Chicago, U. S. A., has opened permanent offices at No. 23 Yamashitacho, Yokohama, where he will be pleased to continue receiving enquiries for any information regarding the machinery manufactured by his company. Mr. Brabrook has been travelling through the Orient for more than 3 yrs., during which time he has formed a wide business acquaintance. He is now handling an extensive line of high-grade machinery for which there is a constantly-growing demand thoroughout the Far East.

RAILWAYS, SUPPLIES, ETC.

RAILWAY CONCESSIONS, CHINA.—The Peking authorities have notified the foreign ministers that all agreements concerning railways will be cancelled as they expire.

RAILWAYS, PHILIPPINE ISLANDS.—The Islands of Samar and Leyte have been excluded by all bidders for concessionary grants to construct railways in the Philippines.

CHING-HAN (LU-HAN) RAILWAY, CHINA.—A branch of this line, it is reported, is about to be built to Anyang in Honan, where there are rich coalfields, in order to facilitate transportation.

CANTON-HANKOW LINE.—Great excitement has been prevailing among the gentry and merchants of Canton, in consequence of the viceroy's proposal to levy new taxes for the construction of the Canton-Hankow Railway.

CABANATUAN EXTENSION, MANILA & DAGUPAN RAILWAY, P. I.—Governor-General Ide, of the Philippine Islands, recently drove the silver spikes that mark the completion of this line in front of the Cabanatuan station. The event was attended by much ceremony.

ANHUI (CHINA) RAILWAYS.—Lord Li, director of Anhui Railways, recently made a request for a piece of land in the Settlement of Wuhu, but the British consul absolutely refused to consider it. Lord Li has appealed to Peking to communicate with the British minister, asking him to instruct the consul to consent to the proposal.

SWATOW-CHINCHOW LINE.—This railway probably will be opened to traffic during the approaching Spring, as only a small portion of the line remains unfinished. When this line is completed, it is quite likely that the contractors will direct their attention to the proposed Canton-Whampoa Railway, which is to connect with the Swatow-Chinchow.

JAPANFSE RAILWAY EXPERTS FOR CHINA.—In response to the application of Viceroy Chang Chih-tung, made through the Chinese minister at Tokyo, for the engagement of two Japanese railway experts, the Japanese authorities have recommended Dr. Haraguchi as chief expert and Mr. Omura, an expert in the Japanese Government railway bureau, as assistant. The experts are soon to enter upon their new duties.

STEAM TRAMWAY, PANIQUE, PROVINCE OF TARLAC, LUZON, P. I.—The Philippine Commission has granted a franchise to the Manila Construction Company to build a steam tramway, sidetracks, etc., from the station of the Manila and Dagupan Railway in the jurisdiction of the Town of Panique, Tarlac, W. to and through that place and the Barrios of Salomague, Cabayacasan, Aduas, Batang, Mabilang, Marini, Matubog and Nibalio, to the Town of Camiling, in the same province. The line will be 2½′ gauge.

HOME-MADE RAILS FOR CHINA.—The Peking Government has ordered all railway administrations to satisfy their requirements for rails and other iron works exclusively in China. The Board of Commerce has issued a similar order to all governors, special attention being drawn to the large iron works of Hanyangfu, Hupeh Province, which, it is claimed by the Chinese authorities, can satisfy all demands. The Board of Commerce is of the opinion that the profit out of the contracts for rails and other iron supplies should not be enjoyed any more by foreigners but by the Chinese themselves.

TIENTSIN-CHINKIANG RAILWAY.—The officials of Shantung, Chihli, and Kiangsu, who have been agitating for the cancellation of the Anglo-German railway, have been definitely informed that it is impossible to do this. One minister of state has advised them, however, to defeat the foreign scheme in another way—by getting enough money together quickly and constructing a railway from Tientsin to Techow before the Germans can complete theirs, and in this way render the foreign concession valueless. This proposition appears to have appealed strongly to the interested Chinese who are laboring industriously to carry it out.

SEOUL-WIJU RAILWAY, KOREA.—The Japanese Government has already spent -Y-20,000,000 in the construction of the Seoul-Wiju Railway, and will not have to spend another -Y-20,000,000 in relaying the line. The work will take more than 3 yrs., and the expenditure is to be defrayed from the military funds for the time being. The Masan Railway is also to be relaid so as to make it a substantial and permanent work, instead of a hastily-made temporary affair. The cost will amount to about -Y-1,000,000, and the work is expected to be completed in 1908. A railway department will be established in the residency-general of Korea, to deal with all matters relating to the Japanese Railways in Korea.

ELECTRIC LIGHTING, TRACTION POWER, ETC.

BORNEO CABLE.—The Commercial Cable Company's new cable between Makassar, Celebes, and Balikpapan, Borneo, has been opened for business.

COMMUNICATION WITH ST. PETERSBURG REESTABLISHED.—The Imperial Chinese Telegraph Administration announces that communication with St. Petersburg is again reestablished.

NEW ELECTRIC TRAMWAY, JAPAN.—The Tokaido Electric Tramway Company, organized with a capital of -Y-6,500,000, proposed to construct a line between Shinagawa and Kodzu, on the Tokaido, *via* Yokohama.

PACIFIC CABLE SERVICE EXTENSION.—It is announced by Mr. George Gray Ward, vice-president of the Commercial Pacific Cable Company, that the cable connection between San Francisco and Shanghai and Yokohama will be completed and in good working order by April 1st, next.

TELEPHONE CONCESSION NETHERLANDS INDIA.—A concession has been granted by the Netherlands India Government for a telephone connection between the Island of Great Sambu, Rhio Archipelago, and Singapore. The Royal Dutch Petroleum Company is interested in the venture.

"WALDORF" HOTEL, LONDON.—London is to have a superb "Waldorf" hotel, with all the modern refinements in electric light, motors, elevators, etc. Messrs. J. G. White & Co. (Ltd), of London, branch of Messrs. J. G. White & Co. (Inc.) of New York City and Manila, are the contractors. An initial expenditure of $1,500,000 will be made.

ANOTHER AMERICAN CABLE TO THE ORIENT.—A bill has been introduced in the American Congress, on behalf of the North American Telegraph and Cable Company, which is incorporated under the laws of the State of Washington, U. S. A., for the privilege of laying a cable between Seattle and Manila, and between the same city in America and China *via* the Aleutian Islands, Siberia, Manchuria, and Japan.

ELECTRIC RAILWAY EXTENSION, JAPAN.—The second extended line of the Yokohama electric tramways from Bashamichi to Nishino-hashi, through Samiyoshicho, the front of the customs and Satsumacho, has been opened to traffic. The electric railway between Kanagawa (Yokohama) and Shinagawa (Tokyo) has also been opened. The cars of the latter leave each terminus every 5 mins., and the through fare is 18 *sen* single journey and 34 *sen* return.

ARC LAMPS, MANILA.—The Municipal Board has decided to adopt a new arc lamp, which is erected by the Manila Electric Railroad and Light Company, on the experimental circuit in Ermita and Malate. After 50 of what is known as "enclosed" arc lamps were installed, the company called the attention of the Municipal Board to the superiority of these lights. Five hundred of the new lamps will be installed in the city as soon as practicable.

THE TROLLEY IN JAPAN.—The *Kobe Chronicle* thinks there is about to be a boom in electric railways in Japan. The government railway passenger traffic between Kobé and Osaka has been so affected by the Hanjin Electric Railway that the imperial railway working bureau is considering the advisability of establishing an electric line between the two cities, and so meeting the competition. The bureau is also considering the establishment of such a railway between Tokyo and Yokohama. The extent of this competition may be judged when it is considered that the business man living in Kobé, who has to make frequent visits to Osaka, by using the electric railway not only saves enormously in the amount of fare, but travels nearly as quickly. He uses the electric route because of its freedom from soot and dust.

JAPANESE COTTON MILLS.—There is at the present time a strong tendency on the part of the Japanese to turn to England to obtain the equipment for the enlargement and modernizing of their cotton weaving industry. The situation, however, is being closely watched by American importing houses having branches in New York City, and there is a strong belief that steam turbo-generators, which are looked upon with high favor by the Japanese, with electric motors adapted to running looms and spindles in number of 8 or 10, will meet with success. The engineer of the American Trading Company is making a close study of the situation, and says that manufacturers of steam turbo-generators, motors or dynamos can obtain full information in regard to this matter by corresponding with the New York office of that company. This particular matter is being watched closely by representatives of English and German concerns.

VALUABLE FRANCHISE GRANTED IN MANILA, P. I.—The Philippine Commission has granted to the Manila Electric Railroad and Light Company permission to construct an electric tramway line from Manila to the Pueblo of Pasig, beginning at the corner of Calle Cabildo and the Ayuntamiento (palace) in the Walled City, passing in front of the Catholic Cathedral to Calle Claveria, thence W. with double track along the latter street to a point E. of Malecon Drive, thence N along the glacis parallel with Malecon Drive to the Pasig River at the Anda Monument, thence W. along the Pasig River to the E. end of the present quartermaster warehouses, thence around the warehouses with a single-track loop, and the necessary sidings and turnouts. The company has the right to carry freight and parcels over ethe line thus enabling it to transport freight direct from the terminal of the Manila and Dagupan Railway, in the Trozo District, through the city to the wharves and docks which are to be constructed along the Malecon. Under the terms of the franchise the grantee must pay to the treasurer of the Philippine Islands, for the benefit of the City of Manila and the Province of Rizal, 2½ per cent of the gross earnings from the business done under this franchise, and the act of the commission which grants the franchise contains the proviso that the franchise may be withdrawn by the Municipal Board, with the consent of the Philippine Commission, by giving 12 mos.' notice to the grantee. Messrs J. G. White & Co. (Inc.) will construct the extension.

ORDERS FROM JAPAN WITH AMERICAN CONCERNS.—Takata & Co., 10 Wall Street, New York, have secured a contract from the Nippon Seido Riusan Hirio Kaisha for considerable electrical apparatus, orders for which have been placed by their New York office as follows: One Westinghouse 225-kw., 440-volt, 3-phase, 60-cycle, rotating field, alternating current, engine type generator, operating at a speed of 225 r.p.m., direct-connected to a Westinghouse 18 and 36 by 16 compound engine. A 12½-kw, type "S," 125-volt, compound-wound generator has been ordered for an exciter. This exciter will be driven by means of a belt from a pulley on the engine. The order also includes a Type 6-B, 3-phase generator panel and a Type 6-B, 3-phase feeder panel, together with all the necessary instruments, etc., mounted upon it; also one 20-h. p., 400-volt, 3-phase, 7,200 alts., induction motor; one 30-h. p. ditto, one 50-h. p. ditto, and one 75-h. p. ditto. The order also includes a lot of portable instruments, etc. Takata & Co. have also ordered for the same contract, from the Knowles Steam Pump Works, one surface condenser containing 600 sq. ft. of cooling surface, mounted over a combined air and circulating pump, size 10 x 12 x 12 x 12, and one horizontal duplex power pump, double acting piston pattern, size 5½ x 6; speed 50 r.p.m., direct driven by a Westinghouse 7½-h. p. motor; also from the Burt Manufacturing Company, for use on the engine, one standard exhaust head. The contract also calls for one 10x10 air compressor having a capacity of 135 cu. ft. of air at 150 r.p.m. This compressor was ordered from the Bury Compressor Company, Erie, Pa., and is direct driven by a Westinghouse 30-h. p. motor.

MORE JAPANESE ELECTRIC ORDERS.—Takata & Co., New York engineering department, reports the following recent orders from Japan for Westinghouse machinery, etc.: *Takata & Co., Tokio*—Ten 1-kw, type "N" transformers, 7,200 alternations; twenty 2-kw type "N" transformers, 7,200 alternations; twenty 3-kw type "N" transformers, 7,200 alternations; twenty 4-kw type "N" transformers, 7,200 alternations; twenty-five 5-kw type "N" transformers, 7,200 alternations; ten 7½-kw type "N" transformers, 7,200 alternations. *Osaka Arsenal*—One portable wattmeter, single-phase, 7200 alternations; one portable voltmeter, direct current and alternating current; one portable ammeter, alternating current. *Nagoya Industrial School*....Two 10- h. p. shunt-wound, type "S" motors, 110 volts; two type "K," direct-current, 120-amp. ammeters. *Osaka Arsenal*—Two type 8-A, 250-volt, 3-phase, feeder panels, an extension to a previous Westinghouse installation. *Ashio Mine*—Three 150-h. p. 2,000-volt, 6,000-alternations, 3-phase, type "C," alternating-current induction motors; two 25-h. p., 500-volt, 6,000 alternations, 3-phase, type "C" induction motors; one 15-h. p., 500-volt, 6,000-alternations, 3-phase, type "C" induction motors; one 15-h. p., 500-volt, 6,000-alternations, 3-phase, type "C" induction motor, arranged for gear connection to a countershaft, complete with Laminar fibre motor pinions, gear wheel, etc.; six 75-kw, 2,000-520-volt, 6,000-alternation transformers; three 50-kw, 2,000-520-volt, 6,000-alternation transformers. *Takata & Co., Tokio*—Ten direct-current, enclosed arc lamps, series potential, 200-220 volts, 16 series resistances. *Hokkaido Tanko Railway Company*—One 75-kw, single-phase, alternating-current, revolving armature generator, 7,200 alternations, 2,200 volts, 720 r.p.m., driven by a Westinghouse standard engine, 13½ by 12,; one 2-kw, 125-volt exciter for the above generator; one marble switchboard consisting of one exciter panel, one generator panel, one feeder panel, for the control of the generator and the exciter mentioned above, together with three feeders; ten 5-kw, type "B" transformers; five 3-kw, type "B" transformers.

WATERWORKS AND IRRIGATION

EXPERIMENTAL IRRIGATION, MADRAS.—The Government of Madras is talking of a very large area of land in the Bellery District for the establishment of an experimental pumping irrigation farm on the Hagani River.

CANTON (CHINA) WATERWORKS.—Although the preliminaries connected with the proposed construction of the Canton waterworks are being proceeded with as rapidly as possible, according to *The China Mail*, the viceroy is anxious to have the work completed sooner than was at first anticipated. He has instructed the Prefect of Kwongchowfu to arrange with the foreign contractors to complete the work within 3 mos., as the viceroy is afraid that owing to the undrinkableness of the present water supply public health will be greatly endangered on the approach of the plague season.

PROPOSED WATER SUPPLY, BANGKOK.—An 8″ artesian well at Dusit Park, Bangkok, is flowing freely and is capable under air compression of supplying 1,000,000 galls. of water daily, and this fact has led to the consideration of a proposition to utilize artesian water for city consumption. By putting down 10 of these wells in a restricted area, as is frequently done in America, putting air compressors on them and forcing the water into a central well and from that to a standpipe at least 100′ high, 10,000,000 galls. of water daily, it is estimated enough for the use of the entire city can be furnished. Besides the healthful effect of pure water upon the inhabitants, the proposed system would solve the question of fire protection, etc.

BUILDINGS

HARBOR OFFICE, HONGKONG.—It is understood that the new harbor office at Hongkong will be ready for occupancy in March.

NEW HOTEL FOR TOKYO.—The Imperial Hotel Company, Tokyo, proposes to build a new hotel of 100 rooms, of which the present hotel will be a branch

BARRACKS FOR CONSTABULARY, PHILIPPINE ISLANDS.—Plans are being prepared at Constabulary headquarters in Manila for the construction of a number of barracks for the enlisted men in the insular rural guard.

BONDED WAREHOUSES, YOKOHAMA.—A scheme for the establishment of bonded warehouses at Yokohama has been filed for government approval by Messrs. Hiranuma Enjiro and Suga Jinzo. The warehouses are designed to cover a space of 2,141 *tsubo*.

EPISCOPAL CATHEDRAL, MANILA.—The corner-stone of the Episcopal Cathedral of St. Mary and St. John was laid January 25th. The work of construction was commenced in November by the Atlantic, Gulf and Pacific Company. It will be a reinforced concrete structure.

NEW HOTEL, MANILA.—At the suggestion of the Philippine Commission the Municipal Board of Manila has postponed the date for advertising for bids for the construction of a hotel building on the proposed Luneta Extension site. It had been the intention to begin advertising next month.

NEW MILITARY BUILDINGS, CAMP STOTSENBERG, P. I.—The B. W. Cadwallader Company has secured the contract for the construction of new military buildings at Camp Stotsenberg, the amount submitted being ₱271,950. O. F. Campbell, of Manila, bid ₱280,988, and S. C Choy, Manila, ₱282,000. Contractor Delmar W. Smith bid with the B. W. Cadwallader Company. Part of the buildings are to be completed in 30 days, and the remainder in 60 days, from the date of the contract.

PUBLIC WORKS

FRENCH SETTLEMENT, TIENTSIN.—During the present yr. about $100,000 will be spent in public improvements in this settlement.

ADDITIONAL SEWERAGE, MANILA.—The Department of Sewer and Waterworks Construction, Manila, is advertising for contracts for an additional sewer system to be laid through the new-made section of land along the bay front on the W. side of Malecon Drive, and through the reclaimed area designated as the Luneta Extension. The sewerage through the new district will connect the new sewer system proper in the Walled City.

IMPROVING CANTON, CHINA.—Under the supervision of a local engineer, Canton, according to *The China Mail*, in the vicinity of the site of the old Temple of Longevity, is undergoing transformation. Two hundred and fifty houses for Chinese are to be built on sanitary lines, and after the style of those common in Hongkong, and they will stand on roads 30′ wide, with scavenging lanes in the rear. Thirty feet roadways will be quite a novelty in Canton. A new theater and a police station are also to be built.

CALAMBA-BAY-LOS BAÑOS ROAD, LUZON, P. I —The Philippine Commission has appropriated out of the present bond issue for public improvements in the Philippines, the sum of ₱35,600 for the completion of the Calamba-Bay-Los Baños Road, Laguna Province, Island of Luzon. This road has been in process of construction since March, 1904, when ₱34,000 were set aside to start the work. The road will be 11 ms. long and will form an important link for transportation around the S. coast of Laguna de Bay.

PUBLIC WORKS, SAGHALIEN.—The public works which are now being carried out on the Island of Saghalien, in Southern Karafuto, under the direct supervision of the Civil Administration of Japan, are the felling of timber in Shiretoko Promontory and the construction of a road over 50 ms. long between Darineh and Mautchi. The lumber factory originally established at Arakuri by the Russian Government, is being used, and about 40 people are at work there. More than 3,500 coolies are engaged in the construction of the road, which is expected to be completed before midsummer. At Korsakoff the erection of a civil administration office and a club-house, the latter on the site of the former Japanese consulate, is progressing.

PORT WORKS, DREDGING, DOCKS, ETC.

FOURTH DOCK OPENED, JAPAN.—The new Fourth Dock, at Yokosuka, 550 x 87 x 31½ ft., was recently opened.

POR-ARTHUR DOCK REINSTATED.—The Japanese have thoroughly reinstated the dock at Port Arthur, and it will now take in vessels up to 6,000 tons.

MANAGEMENT OF SHANGHAI DOCKYARD.—The Peking Government has sanctioned the change of management of the naval dockyard at Shanghai, which, in future, will be conducted as a commercial enterprise.

CONSOLIDATION OF PACIFIC OCEAN LINES.—There is an unconfirmed report, which seems to carry with it considerable foundation, that the fleet of the Pacific Mail Steamship Company has been absorbed by the Toyo Kisen Kaisha (Oriental Steamship Company) of Japan.

SANDAKAN SLIPWAY.—*Peerless*, a 3-masted schooner from Cebu, P. I., was recently drawn up on the slipway of the China Borneo Company at Sandakan. The vessel is 127′ long with a beam of 33′ and depth of hold 9′ 9″. It is estimated that when drawn up her dead weight was between 450 and 500 tons. The China Borneo Company has also overhauled the S.S. *Borneo*, from Zamboanga, Province of Mindanao, P. I.

YOKOHAMA HARBOR WORKS.—The Government of Japan has decided to appropriate -Y-8,500,000 towards the improvement of Yokohama Harbor—for dredging, breakwater works, landing facilities, etc. The scheme of work is to be finished in 6 yrs., and of the cost the Municipality of Yokohama will bear ⅓. To meet this expense it is proposed to issue municipal bonds, and arrangements have already been made to float a loan among foreign capitalists.

WHARF AT TANJONG BATU, B. N. B.—The wharf at Tanjong Batu is in hand and 5,000-ton cargo boats will be able to lie alongside. A careful survey to the approach is required. The Tobacco Estates at the head of Maruda Bay will use this port when it is completed. A railway now in course of completion will lead to a pier on the spit at the N. end of Tanjong Batu Bay which will continue out to sea until a depth of 26 ft. at l. w. s. tides has been reached.

NIPPON YUSEN KAISHA'S EUROPEAN SERVICE.—This company has placed the American liner *Iyo-maru* on its European line, which had been maintained exclusively with chartered foreign ships since the beginning of the war. She has sailed from Yokohama for European ports. *Shinano-maru*, which was recently released from the government service, has taken the place of *Iyo-maru* on the American berth. The steamers *Nikko-maru* and *Yawata-maru* have been placed in the Australian service.

WHANGPOO CONSERVANCY, SHANGHAI.—The viceroy has established an office of the Whangpoo Conservancy at Shanghai, and has appointed Mr. Ku Hung Ming as resident director to manage the general affairs of the Conservancy Board. The viceroy also appointed Mr. John Goodnow as adviser on foreign affairs to the board, and an expert, Taotai Ho, as assistant general director. It is claimed by certain newspapers on the China Coast that the viceroy has exceeded his authority in making these appointments, and they are calling upon the foreign ministers at Peking to call upon the Peking Government to rescind his action.

IMPROVEMENTS AT WONSAN, KOREA.—The British pro-consul at Wonsan, Korea, reports particulars of an extensive reclamation scheme which is to be undertaken by the Japanese municipality at that port. The ground so reclaimed will be sold for commercial purposes. The depth of water alongside of portions of the new sea frontages will be upwards of 20′, and probably wharves and piers will be constructed. It is expected that the railway depôt will be established near these wharves The course of the river will probably be altered. The work is estimated to cost something under -Y-1,000,000, and will render the port one of the best in Korea. In giving his consent, as commissioner of customs, to the undertaking, Mr. Wakefield, the British pro-consul, stipulates that subjects of all nationalities shall have the right to purchase and hold ground in the area to be reclaimed on equal terms. This has been accepted by the Japanese consul.

SHIPBUILDING, MARINE, ETC.

JAVA-CHINA-JAPAN LINE.—A new steamer for the service of this company in East Asia has been ordered from the Company de Schelde, at Flushing.

STEAMER *Ohio IV* SOLD.—The Deshler steamer *Ohio IV* has been sold to the Nippon Yusen Kaisha and renamed *Hiroma-maru*. The Deshler service between Shanghai and Chefoo has been suspended.

ANOTHER JAPANESE DESTROYER.—A destroyer to be named *Oikaze* is to be launched at the Maizuru Navy Yard, Japan, shortly. The vessel is 375 tons displacement with a speed of 29 knots, and will be armed with 6 quick-firing guns.

REPAIRS TO SHIPS, KIANGNAN DOCK, SHANGHAI.—The steamers *Poyong* and *Kiangfoo* are being repaired at the Kiangnan Dock, Shanghai. The whole bow of *Poyong* is smashed, her stem being broken in two places. The repairs to *Kiangfoo's* engines will occupy 2 mos.

ICE-BREAKER FOR VLADIVOSTOCK.—An ice-breaker, ordered by Messrs. Kunst & Albers, Hamburg and Vladivostock, has undergone a successful trial trip, and will be transported to the Siberian port by the Hamburg-America Line. The ice-breaker is named *Paul*, and has engines of 180 h. p.

NEW VESSELS, TOYO KISEN KAISHA.—Two steamers for this line, to ply between Oriental ports and San Francisco, are being built at Nagasaki, work on them having commenced in November last. The vessels are to be 12,500 tons burden, and it is expected that the first will be finished by the end of 1907.

ANOTHER CRUISER FOR JAPAN.—The Navy Department of Japan has placed another order with the Mitsu Bishi Dockyard for a cruiser of *Chihaya* type, this being the sixth order secured by the company. Its dimensions are as follows:—Displacement, 1,350 tons; length, 300′; breadth, 31′; depth, 80′; speed, 20 knots.

STEAMER *Macquarrie* SOLD.—This steamship, which has been lying idle in Hongkong Harbor for some time, has been sold for $80,000. She will be employed transporting Russian troops from Vladivostock to Odessa. *Macquarrie* was formerly one of the Ducal Line, and was purchased, after stranding, by Messrs. McArthur & Co., of Sydney, N S. W.

NEW CHINESE STEAMSHIP LINE.—The Paoshêng Steam Navigation Company has been started in Shanghai with offices in the native suburb of Nant'ou, where is also located the wharf of the company for mooring its steamers. The company owns for the present four small steamers. The shareholders of the new concern are mostly Cantonese.

UTILITY OF MOTOR BOATS IN MANCHURIA.—Though the current of the Liao River at Niuchwang ranges from 3.4 to 7.8 naut. ms., per hr., in swiftness, according to the season and state of the tide, motor boats will, it is believed, prove useful on it, and a number will possibly be purchased during the current yr. Port Arthur, Dalny, Harbin, and other points are also suited to motor-boat service.

NEW JAPANESE STEAMER IN COMMISSION.—*Daishin-maru*, a steamer of 1,306 tons, which has been built at the Mitsu Bishi Dockyard, Nagasaki, to the order of the Osaka Shosen Kaisha, has been placed in commission. She is a sister-ship of *Daichi-maru*, recently built by the Osaka Iron Works for the Tientsin Line. During the winter season, when the Pei Ho is frozen, the new steamer will be put on the Tairen or Korean Line, with *Daichi-maru*.

VOYAGE OF THE DRYDOCK *Dewey*.—The mammoth steel floating drydock *Dewey*, which has been constructed for the use of the American Navy in the Philippines, was, at last accounts, crossing the Atlantic Ocean in tow of the tug *Potomac*, and accompanied by three colliers, *Caesar*, *Brutus*, and *Glacier*. Simultaneous with the commencement of this extraordinary voyage the Hydrographic Office at Washington issued a warning to ship captains to keep a sharp lookout for the vessels towing the huge bulk. When strung out on a towline, the dock and the line measure 1 m. A wireless message recently received at Norfork, Va., from *Glacier* showed that the dock was progressing at the rate of about 4½ ms. per hr.

MINES AND MINING

FOREIGN CONCESSIONS, CHINA.—The Peking authorities have notified the foreign ministers at Peking that all agreements concerning mining concessions will be cancelled as they expire.

GERMAN-CHINESE MINING COMPANY.—This company intends to open new mines in the District of Sinn-tschann, Prefecture of Tsinanfu, which are very near to the railway. The scheme has the sanction of the Peking authorities.

YUNNAN AND KWEICHOW (CHINA) MINES.—The Board of Commercial Affairs at Peking has asked the Viceroy of Yunnan to report upon all the mines in Yunnan and Kweichow, and also whether they are operated with foreign capital.

MINING IN MANCHURIA. H. E. Chao Erh-hsün, Tartar general of Fêngtien, has asked the Peking authorities to establish a bureau of mining affairs to investigate the mines in Manchuria and to forestall any foreigners in claiming them.

HUNGCHUNG IRON MINES, CHINA.—The iron mines at Hungchung, Shansi Province, on which a Belgium syndicate had designs, has been acquired by a Chinese company, which intends to begin work on the property in the Spring.

ENLARGING MILLING PLANT, PANTAI, F. M. S.—The Milling and Mining Company, F. M. S., is adding another 20 head of stamps to its plant at Pantai. Part of the plant of the Rin Lode Mine, at Jelebu, purchased by M. Kester, will go to Pantai, while the remainder is for use on M. Kester's property close by.

WORKINGS ABANDONED, BORNEO.—The Borneo Company, Ltd., has closed down its old workings at Jambusua These were started towards the end of 1901, and a considerable pumping plant was erected. However, the quantity of gold found has been too small and the expense of obtaining it too great to bring profit.

FUSHUN COAL EXPORTS.—Recently 1,850 tons of coal from the Fushun mines were imported at Wakamatsu, Japan, for the first time and the fuel is now under trial at the government iron foundry. The Fushun lump coal is reported to be equal to 1st-class Kyushu coal, in quality, but the dust coal is very inferior.

FRENCH CONCESSIONS, FUKIEN.—The concessions granted to French citizens to open gold mines at Kienningfu and Chanwufu in Fukien not having been acted on before the expiry of the stipulated period, the Chinese authorities proposed to cancel them, but the French minister at Peking has asked for an extension of from 2 to 3 yrs., the delay being due to unavoidable circumstances.

MINING IN THE FEDERATED MALAY STATES.—The number of gold-mining companies under European management has of recent yrs. dwindled sadly in Pahang. As regards tin there are only six companies left. The only working gold-mining company left is the one at Raub, under the management of Mr. W. H. Martin Time was when there were over a score of companies falling over each other in Pahang, but conditions have changed wonderfully since the days of the "Pahang Boom." The Perak French Mining Company's workings in the Triang are said to be doing well, the ore being exported partly *via* the Kuala and partly through Jelebu. The only other tin working in that locality belongs to a Seremban capitalist.

MINERALS, BRITISH NORTH BORNEO.—The following mineral production is noted:—*Manganese*—At least 20,000 tons of ore are ready for shipment and numerous gangs of coolies are at work blasting and stocking ore constantly; the mountains are full of the ore, both in huge boulders and in beds. *Coal*—Indications have

been found, but the seam is not yet located. *Chromite*—Is being worked. *Iron*—A mountain of very high grade iron ore has been found containing on calculation 15,000,000 tons. *Copper*—Copper ore has been discovered near Tanjong Batu. *Smokeless Coal in Jambongan*—Large floating boulders heve been found in Jambongan Island, one of which weighed 1 cwt. Boring operations are going on to locate the main lode.

India's Gold Mining Returns.—The following are the returns for December, 1905—*Balaghat*—4,400 tons of quartz crushed yielded 3,502 ozs., 2,750 tons of tailings cyanided yielded 313 ozs. and from plates 302 ozs., making a total yield of 4,117 ozs. of gold *Champion Reef.*—Milled 19,720 tons which produced 15,522 ozs., 16,566 tons of tailings treated by the cyanide process produced 2,183 ozs., making a total production of 17,705 ozs. of gold. *Mysore.*—16,650 tons of quartz crushed produed 15,403 ozs., Steamings from plates 1,005 ozs., Basebar (Mills) 239 ozs. and 14,741 tons of tailings cyanided yielded 1,819 ozs., making a total of 18,468 ozs. of gold. *Mysore West.*—Mills ran 679 hrs., crushed 1,879 tons, yielded 1,018 ozs. bar gold. 2,304 tons of tailings treated by the cyanide process yielded 122 ozs. of standard gold. *Nundydroog.*—7,000 tons of quartz crushed yielded 5,186 ozs., 7,290 tons of tailings, cyanided, yielded 650 ozs. and obtained from plates 282 ozs., making a total of 6,118 ozs. of gold *Ooregum.*—Stuff crushed 10,176 tons, gold produced 4,661 ozs. and slimes and tailings cyanided 10,098 tons, produced 918 ozs., making a total of 5,529 ozs. of gold. *Hutti (Nizam's).*—851 ozs. of gold from 2,000 tons of quartz crushed and 273 ozs. from 2,000 tons of tailings cyanided, making a total of 1,124 ozs. of gold.

Mining Industry, Burma.—The latest official intelligence regarding the ruby mining industries in Burma comes through a government blue book just published on the administration of the province in 1904-05. The production of the gem during 1904 was practically confined to the ruby mines district. Stones valued at Rs. 13,92,514 were won by the Ruby Mines Company in 1904 as against Rs. 14,68,636 in 1903, though 4,00,000 more truck loads of earth were treated than in the previous year. The royalties paid by native miners fell from Rs. 3,51,910 in 1903-04 to Rs. 2,20,372 in 1904-05, the decrease being attributed to the exhaustion of the more accessible ground. The construction of an important drainage tunnel was undertaken to prevent the flooding of the mines. The total output of gold in 1904 was 215.76 ozs. The Kyaukpazat mine which produced nearly 1,400 ozs. of gold in 1903 was closed during that year, the reef being worked out, and the output of 1904 was obtained almost entirely by dredging. Several concessions for gold-dredging operations were granted by the authorities in 1904 during the course of which a number of applications for exploring or prospecting licenses and for mining leases were dealt with by the government. An expert examination of the gold-bearing rivers of Upper Burma is to be made with a view to the framing of suitable regulations Among other mineral industries in Burma that of jade mining continues to expand satisfactorily. From the Myitkyina mines, the output of jade rose from 1,169 cwts. of the value of Rs. 77,691 in 1903 to 2,244 cwts. of the value of Rs. 1,50,087 in 1904, the value of the exports of the stone to China, which absorbs the whole of the output exceeding in 1904 by Rs. 80,000, the figures of 1903. Dynamite is now freely used in the working of the mines, There is some interesting information regarding the progress of the Burma petroleum industry in the same official report. The total production of oil in 1904 was 115,903,800 galls. or 30,575,313 galls. in excess of 1903. No effective competitor has appeared against the Burma Oil Company, which again largely increased its output. The principal oil-bearing fields are the Yenangyaung field, which has now been extended N. to Singu in the Myingyan District and the Yenangyat field. Efforts were made during the yr. by prospectors to follow up the course of the in rich oil bearing seams of the Yenangyaung and Yenangyat fields, but concessions granted the Lower Chindwin, Shwebo and Upper Chindwin districts and in Thayetmyo and in Prome proved unprofitable. The Arakan oil fields in the Kyaukpyu and Akyab districts also continue to produce oil, but the output was small. Negotiations were in progress during 1904 regarding arrangements for the construction by the Burma Oil Company of a pipe-line to connect the Yenangyaung and Yenangyat oil fields with the refineries at Rangoon for the purpose of reducing the cost of carriage.

MISCELLANEOUS NOTES

Wool for Japan.—Japanese factories are at the present buying most of their wool in the Australian market.

Public Works Department.—The Surveyor's and Engineer's Department of the Municipal Council, Shanghai, is in future to be known as the Public Works Department.

Sugar Refinery Works, Tsingtau, China.—Messrs. von During Wiebel & Co. will shortly erect large sugar refinery works at Tsingtau, to cost about 1,000,000 marks.

Domestic Exhibition Postponed, Japan.—The Japanese Government has postponed indefinitely the sixth domestic exhibition, which should have been opened in 1907.

Oil Operators Amalgamate, Japan.—The leading owners of the oil wells in Formosa, Hokkaido and Aomori have decided to amalgamate their interests with a capital of -Y-1,500,000.

Cardiff Coal Receipts, Hongkong.—During 1905 Cardiff coal to the quantity of 306,280 tons arrived in Hongkong, most of which found its way into Japanese possession during the recent war.

"Open Ports," China.—The Chinese Government has formally notified the foreigng ministers at Peking of the opening to foreign trade of the cities of Chinanfu, Weihsein and Chuosun, in Shantung.

Salt Refinery, Liaotung, Manchuria.—Japanese have formed a syndicate for the establishment of a large salt refinery at this place. The syndicate has already raised $1,000,000 for this purpose. The sale of the salt and the whole establishment will have an official character.

Rizal Monument, Manila.—The Philippine Commission has passed an act which provides for the free entry through the customs of the figure, stone, and other materials necessary for the monument to Dr. José Rizal, the Filipino patriot and martyr, which is to be erected in Manila.

Brick Factories, Hupeh, China.—The provincial administration of Hupeh is establishing brick factories which will be able to supply the demand for the building of public schools in the province. Factories are being built at Tjinkou and in the Spring the manufacturing of brick will be commenced in earnest.

Automobiles in China.—According to an American consular report the American automobile seems to be firmly established in China, and the growth in the sale of these vehicles is very noticeable. The New York Export and Import Company is the only American concern in Shanghai dealing in automobiles.

Lighting Contract, Perak, F. M. S.—Messrs. Huttenbach Bros. & Co. have obtained the contract for lighting the new Kitson lamps at Perak for a period of 2 yrs., 10 mos. Messrs. Tate & Co. will light the present lamps till March 1st, by which time the total number of 84 lamps required will be erected.

Trade Calendars, 1906.—The Far Eastern Review is in receipt of some elaborately-designed and very beautiful trade calendars for 1906. The following firms have contributed:—Alhambra Cigar Factory, The Club Stables, and E. C. McCullough & Co., Manila, and the Morris Machine Works, Baldwinsville, N. Y.

Kerosene Oil Trade, Manchuria.—American kerosene oil has secured a monopoly of this trade in Manchuria, almost completely eliminating the Russian product from this part of China. Sumatra oil continues to compete very strongly with the American product in other parts of China, particularly in South China.

Belgium's Trade with China.—Published statistics give the following as Belgium's trade with China for the past year:—Railway cars, $399,510; machinery (not denominated), $208,866; steel, unfinished, sheets and bars, $434,636; steel, finished, $418,231; brass and nickel, $11,580; cast iron, finished, $12,545; old iron, $3,524; wrought iron, $1,056,096; finished iron, $ 415,722; galvanized iron $2,509; zinc, $56,742. Total (gold) $3,019.871.

Wakamatsu Iron Foundry, Japan.—According to the *Jiji* during the late war, the Wakamatsu Government Iron Foundry greatly extended its business. It was able to furnish the military authorities with rails for laying light railway lines; and it built locomotive engines of small size for the same. The blast-furnace was also got to work smelting, and every class of material rquired for the manufactures of arms could be obtained from the Foundry. Thus it is now possible, the journal adds, that the Wakamatsu Foundry, in co-operation with the Government arsenals, may realize the long-cherished hope of manufacturing all classes of weapons without depending on any foreign aid whatever.

American Goods in Manchuria.—An American consular report says that while a large percentage of the coasting steamers fly the British flag, the English-made goods, particularly cottons, do not sell in the Manchurian markets as readily as those imported from America. As a rule, however, the fact that American and English goods are to be relied upon goes far to cause ready sales in that part of the world. The Chinese purchaser feels that American-made goods are safe to buy, and for that reason it has been temporarily profitable in the past to foist upon the Chinese cheap imitations of honest American wares. The protection now afforded by trademarks, jointly by the United States and Great Britain, will practically eliminate this infringement.

Growth of Manufacture, Japan.—According to a report of the minister of finance of Japan, exports of manufactures have increased from $27,000,888 gold in 1900, to $48,306,000 in 1904. Of late the government has made great efforts to assist manufactures. It has held expositions at home, taken part in foreign expositions, established an office to study industrial conditions, assisted the organization of industrial associations , and sent abroad many subjects to study foreign industries. To facilitate the participation of capital in industrial undertakings, the mortgage law was passed last March, according to which the land, machinery, etc., belonging to an industrial establishment constituted a security fund for mortgage purposes.

Aermotors and Windmills, Siam.—The Government of Siam is completing preliminary surveys for an elaborate system of irrigation which is intended to convert much of what is at present waste land or forest into productive fields for the cultivation of rice, the great staple of the country, and also for fruits and vegetables. In order to irrigate their fields from the present system of *klongs* or small canals, which penetrate the area now under cultivation, the Siamese use the most primitive methods, consisting of scoops suspended by a rope from a stick or a kind of treadmill containing small compartments, each of which brings up about 1 pt. of water. Both of these methods are performed by coolie labor. With the introduction of more extensive and scientific systems of irrigation will undoubtedly come a demand for improved methods of raising water for the fields, and this demand should be supplied by aermotors, windmills, and pumping apparatus. One or two American aermotors are now in use there and are giving satisfaction. Recent orders of Danish machinery of this kind have also been given.

Canada's Export Trade with the Orient.—In its export trade the Dominion of Canada is seeking openings in the Orient. It is assumed that whenever the Grand Trunk Pacific completes its line to the coast this result will follow, though the Canadian Pacific already has a line of steamers between Vancouver and Oriental ports A flour trade in competition with the United States is predicted. Mills at Alberta, at Calgary, are now building with the hope of shipping flour to Japan instead of sending all the grain E. in the form of wheat. Four more flour mills are also projected for Vancouver. Whether Canadian goods other than foodstuffs ever will find a large market in Japan and China is problematical The dominion hardly will be able to compete with machinery shipped from the United Kingdom. It is probable that Canada will come within the provisions of the general trade treaty between Great Britain and Japan, application for these concessions having been made. Under this treaty the Japanese tariff against Canada will be reduced on hides, leather, leather goods, condensed milk, sugar, livestock, cotton and woolen goods, paper, enamelware, rubber goods, and hats and caps.

FINANCIAL NEWS

Banking Branches in Kobe.—The projected Kobé branch of the Deutsch-Asiatische Bank has been established. The Russo-Chinese Bank has reopened its Kobé branch.

Banks of Japan.—According to investigations completed by the Tokyo Government, the number of banks throughout Japan are 2,255. Their combined capital is -Y-530,880,819.

Korean Auxiliary Coinage.—The Osaka mint has struck -Y-30,000 worth of 1-*sen* and ½-*sen* copper coins of the Korean auxiliary coinage, which have been sent to Korea for circulation.

Chinese Eastern Railway.—The French minister at Peking is reported to have proposed to the Chinese foreign office that France should furnish China with the money to repurchase the Chinese Eastern Railway from Japan.

Standard China Company.—This company has been organized with a capital of £100,000 in £1 shares to acquire lands, mines, mineral grants, mining rights, concessions, etc., with particular reference to Yunnan, or elsewhere in China.

British North Borneo Company.—It is announced in London that this company has made arrangements for the issue of shares up to 500,000 of its unissued capital. The money received for these shares will be devoted to the general purposes of the company, to the paying off of debentures, and towards the extension of the projected railway across the state to Cowie Harbor.

Money for Mines and Railways, China.—Owing to the lack of funds for promoting mining and railway interests in the provinces of China, the Peking Government is going to raise a railway and mining loan among the Chinese merchants and others, at $500 per debenture bearing 5 per cent interest *per annum*. The loan may be redeemed at any time after the lapse of 30 yrs. from date of issue.

China Provident Loan and Mortgage Company, Ltd., Hongkong.—At the 9th annual meeting of this corporation it was reported that the gross earnings during 1905 amounted to $131,721.22 as against $132,860 for 1904, so the company is able to pay a dividend of 8 per cent and place $20,000 to reserve, which brings that fund up to the round number of $100,000, leaving $4,791.73 to the credit of the current yr.'s account.

Peking Syndicate, China.—The Peking authorities have telegraphed to the Chinese minister at London stating that they have made arrangements with the British minister in Peking regarding the purchase of the Peking Syndicate's Taokou-Chinghua Railway, about 270 *li* in length, in Honan Province, by the payment of £700,000, which will be regarded as a Honan railway loan at 5 per cent interest *per annum*.

Hongkong Land Reclamation Company, Ltd.—The net profits of this company in 1905 were $555,781.09 after paying all charges, which sum includes $4,557.32 brought forward from the previous yr. A dividend of 8 per cent will be paid on the paid-up capital and a bonus of 4 per cent thereon. After providing for this and writing off directors' and auditors' fees there remains a balance of $383,058.73 to be carried to the credit of a new profit and loss account.

Japan's Domestic Debt—The Tokyo authorities announce the redemption of a part of the 6 per cent domestic debt, doubtless with the proceeds of the last foreign loan. The program is that -Y-40,000,000 worth of bonds sold originally at 90, drawn by the lot during the fore part of the current mo., shall be redeemed between March 21st and 31st. Another -Y-40,000,000, redeemable between April 16th and 25th, has also been drawn. The remainder of this particular 6-per cent loan will be reduced between May 16th and 25th.

Hongkong Ice Company, Ltd.—Messrs. Jardine, Matheson & Co., general managers, have submitted a statement of the company's accounts for the yr. 1905. Including $5,356.77 brought forward from the previous yr., and after deducting $20,000 paid as interim dividend of $4 per share, the balance at credit of profit and loss account is $128,776.31 which it is recommended should be appropriated as follows:—A final dividend of $15 per share, $75,000; provision for contingencies, $20,000; to write off property account, $30,000; to carry forward $3,716.31.

FAR EASTERN SHARE QUOTATIONS

Courtesy of Benjamin, Kelly & Potts, Sharebrokers, Hongkong, February, 1906.

STOCK	WHEN ESTAB-LISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation* PER CENT	CLOSING QUOTATIONS
Banks.												
Hongkong and Shanghai Banking Corporation	1865	$10,000,000	80,000	$125	$125	g £1,000,000 s $8,500,000 i $250,000	$1,702,728	30-6-05	£1.15/- at exchange 1/10½= $18.66.67 for first half-year 1905	21-8-05	5	$895 London £96
National Bank of China, Limited	1891	£699,475	99,925	£7	£5	$200,000	$41,768	31-12-04	$2 (London 3/6) for 1903	1-2-04	—	$38 buyers
Marine Insurances.												
Canton Insurance Office, Limited	1881	$2,500,000	10,000	$250	$50	$1,600,000 j $147,895	$211,540	31-12-04	$20 for 1904	21-10-05	6¼	$325 buyers
China Trader's Insurance Co., Ld.	1865	$2,000,000	24,000	$83.33	$25	$950,000 f $169,215 j $202,455 u $296,955	Nil.	30-4-05	$4½ for year ended 30-4-1905	18-12-05	5	$91 sellers
North China Insurance Co., Ld.	1863	£150,000	10,000	£15	£5	g £100,000 s Tls. 100,000 f Tls. 50,000	Tls. 302,053	30-6-05	Final of 7/6 making 15/- for 1904	25-10-05	5½	Tls. 95
Union Insurance Society of Canton, Limited	1867	$2,500,000	10,000	$250	$100	s $2,000,000 g £40,000 f $331,453 j $1,043,930 u $1,152,346	$2,339,112	30-6-05	$40 for 1904	20-10-05	5½	$735
Yangtsze Insurance Association, Ld.	1862	$800,000	8,000	$100	$60	$750,000 i $50,000 j $5,890	$599,364	31-12-05	$12 and $3 special dividend for 1903	12-4-05	8½	$172½
Fire Insurances.												
China Fire Insurance Co., Ld.	1870	$2,000,000	20,000	$100	$20	$1,000,000 x $218,039 f $2,241	$260,374	31-12-04	$6 dividend and $1 bonus for 1903	10-3-05	8	$88 sales
Hongkong Fire Insurance Co., Ld.	1868	$2,000,000	8,000	$250	$50	$1,200,505	$360,372	31-12-04	$34 for 1903	7-3-05	10¾	$325 sellers
Shipping.												
China and Manila Steamship Co., Ld.	1882	$750,000	(1) 30,000	$25	$25	$5,000	$8,832	31-12-04	$1 for 1904	27-3-05	5	$20 buyers
Douglas Steamship Co., Ld.	1883	$1,000,000	20,000	$50	$50	$261,638 i $88,941	Nil.	30-6-05	$3½ for year ended 30-6-1905	25-9-05	8¾	$40 buyers
Hongkong, Canton and Macao Steam-boat Company, Ld.	1865	$1,200,000	80,000	$15	$15	e $250,000 d i $600,000 f $145,376	$8,064	30-6-05	$1 for first half-year 1905	16-8-05	8	$26 sellers
Indo-China Steam Navigation Company, Ld.	1882	£1,200,000	(2) 60,000	£10	£10	£120,000 i £241,150 h £3,999	£4,435	31-12-04	12/- @ 1/10 ⅞=$6.29.51 for 1904	13-7-05	6½	$97 sales
Shanghai Tug and Lighter Co., Ld. Do. Preference.	1903	Tls. 1,500,000	200,000 100,000	Tls. 50	Tls. 50	i Tls. 25,000	Tls. 43,762	31-12-04	Interim of Tls. 2. for 1905 Interim of Tls. 1¾ for 1905	28-8-05	7½ 7½	Tls. 58½ buyers Tls. 50 sellers
"Shell" Transport & Trading Co., Ld.	1898	£2,000,000	2,000,000	£1	£1	£400,000 i £4,144	£7,815	31-12-04	1/- (Coupon No. 6) for 1905	1-1-06	4½	23/-sellers
"Star" Ferry Co., Ld.	1898 1900	$200,000	10,000 10,000	$10 $10	$10 $5	$65,000 i $24,257	$929	30-4-05	$1.80 90 cents for year ended 30-4-1905	29-5-05	5¾ 4	$32 sellers $23 sellers
Straits Steamship Co., Ld.	1890	$500,000	(3) 5,000	$100	$100	$400,000 e $21,075 i $130,153	$21,231	31-12-04	$10 for 1904	21-3-05	7	$149 buyers
Taku Tug & Lighter Co., Ld.	—	T.T 1,500,000	30,000	T. Tls. 50	T. Tls. 50	Tls. 98,000 d Tls. 195,479 e Tls. 28,000 i Tls. 81,200	Tls. 4,333	31-12-04	Interim of Tls. 2 for 1905	27-7-05	9¼	Tls. 36 buyers
Refineries.												
China Sugar Refining Company, Ld.	1878	$2,000,000	20,000	$100	$100	e $450,000 r $150,000	$42,812	31-12-04	Interim of $10 for 1905	18-8-05	10	$210
Luzon Sugar Refining Company, Ld.	1882	$700,000	7,000	$100	$100	none	Dr. $85,987	31-12-04	$3 for 1897	24-3-98	—	$25 buyers
Perak Sugar Cultivation Co., Ld.	—	Tls. 350,000	7,000	Tls. 50	Tls. 50	Tls. 100,000	Tls. 3,723	31-7-05	Tls. 2½ for year ending 30-9-1904	17-12-04	—	Tls. 72½ sales
Mining.												
Chinese Engineering & Mining Co., Ld.	1901	£1,000,000	1,000,000	£1	£1	d £80,000 h £12,289	£13,355	28-2-05	Final of 1/- (No. 5)	2-11-05	—	Tls. 9.80 buyers
Oriental Consolidated Mining Co., Ld.	1901	G. $5,000,000	y 500,000	G. $10	G. $10	none	G. $672,093	31-12-04	50 cts. final mak. G. $1 for '05 (No. 5)	21-12-05	—	G. $17 sellers
Raub Australian Gold Mining Co., Ld.	1892	£200,000	150,000 50,000	£1 £1	18/10 £1	£4,873	Dr. £8,745	31-3-05	No. 12 of 1/-=48 cents	28-1-01	—	$4¼

STOCK	WHEN ESTAB-LISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation* PER CENT	CLOSING QUOTATIONS
Docks, Wharves and Godowns.												
Farnham (S. C.), Boyd & Co., Ld	1901	T5,520,000	55,200	T100	T100	T1,000,000	.........T34,924	30-4-05	Interim of Tls. 4 for year 1905-6.	6-1-06	9½	T128 sellers
Fenwick (Geo.), & Company, Ld.....	1889 1905	$450,000	6,000 z 12,000	$25	$25	$70,000	...........$8,577	31-12-04	$3¼ for 1904,......................... First year..............................	13 3-05 —	— —	$25 $24½ buyers
Hongkong and Kowloon Wharf and Godown Co., Ld.........................	1886	$2,000,000	40,000	$50	$50	$250 000 d.r. $58,423 i $10,000	.........$29,422	31-12-04	Interim of $2½ for 1905...............	26-7-05	4¾	$108
Hongkong & Whampoa Dock Co., Ld.	1901	$2,500,000	50,000	$50	$50	p $300,000 i $41,500	.......$501,332	30 6-05	$6 for first half year '05	22-8-05	8	$165 sales
New Amoy Dock Co., Ld.....................	1892	$67,500	10,000	$6¾	$6¾	$55,500	Dr....$10,260	31-12-04	$1¼ for 1903....................................	5-5-04	7	$17
Shanghai and Hongkew Wharf Co. Lt.	1902	T3,200,000	32,000	T100	T100	b T487,210 r T59,880	........T10,711	31-12-04	Interim of T6 for 1905...................	23-8-05	5½	T2230 sales
Yangtsze Wharf and Godown Co., Ld..	1902	T250,000	2,500	T100	T100	T17,500	..........T2,762	31-12-04	T18 for 1904..	29-3-05	8½	T212½ buyers
Lands, Hotels and Buildings.												
Astor House Hotel Co., Ld...................	1901	$750,000	(4) 30,000	$25	$25	$14,156	...........$9,028	30-6-05	$2½ for year ending 30-6-1905......	19-8-05	9¼	$27 sales
Astor House Hotel, Ld. (Tientsin)	—	T. T100,000	2,000	T. T50	T. T50	T34,000 e T8,000	.... T806	29-2-05	Interim of T5.....	21-10-05	8	T130 buyers
Central Stores, Ld.......................... Do. (Founders')............	—	$91,845	6,000 123	$15 $15	$12 $12	$20,000	..........$1,502	31-12-04	Final of 60 cents making $1.80 for '04.. None.........	30-3-05 —	12 —	$15 $100
Do. (NewIssue)..............	1904	$360,000	24,000	$15	$7½				Preferential of 7% for '04............	30-3-05	7	$7½
Hongkong Hotel Co., Ld.	1866	$600,000	12,000	$50	$50	$648,975 r $31,087	.........$10,126	30-6-05	$5 for first half-year 1905...............	4-9-05	6¾	$150
Hongkong Land Investment and Agency Co., Ld.	1889	$5,000,000	50,000	$100	$100	e $250,000	.........$37,875	31-12-04	Interim of $3½ for 1905................	27-7-05	5½	$120 ex div.
Hotel des Colonies Co., Ld. (Shanghai)	1902	T225,000	9,000	T25	T25	n T20,986	........, T7,202	31-3-05	Interim of T1................................	1-11-05	14	T17
Hotel Metropole Company, Limited....	1904	$200,000	2,000	$100	$100	none	...........$4,699	30-6-05	Final of $6 making $10 for the year	26-7-05	10	$100
Humphreys' Estate & Finance Co., Ld.	1887	$1,500,000	150,000	$10	$10	i $200,994 e $50,000	.........$11,958	31-12-04	90 cents for 1904..............................	11-2-05	7	$12¾ sales
Kowloon Land and Building Co., Ld. ..	1889	$300,000	6,000	$50	$30	none	.... $377	31-12-04	$3 for 1904...	31-1-05	7½	$40
Shanghai Land Investment Co., Ld......	1901	T2,600,000	52,000	T50	T50	T828,813 e T170,000	.........T40,066	31-12-04	Interim of T3 for 1905................	21-7-05	6¾	T120 buyers
Tientsin Hotel des Colonies, Ld.	1903	T70,000	1,400	T50	T50	none	.... T670	31-12-04	Interim of T3 for 1905............	4-7-05	12	T45 sellers
Tientsin Land Investment Co., Ld.......	1902	T772,600	7,726	T100	T100	i T67,300	.... T725	31-12-04	Interim of T3 for 1905.................	2-8-05	6	T115 sellers
West Point Building Co., Ld.	1889	$625,000	12,500	$50	$50	none	...........$1,247	31-12-04	Final of $490 making $3.65 for 1905	2-2-06	7	$53 ex div.
Cotton Mills.												
Ewo Cotton Spinning and Weaving Co., Ld.	1895	T1,000,000	(5) 20,000	T50	T50	T45,939	.......T100,000	31-10-05	T8 for year ended 31-10-1904..........	18-12-05	17	T48 sellers
Hongkong Cotton Spinning, Weaving and Dyeing Co., Ld..........................	1901	$1,250,000	125,000	$10	$10	e $30,000	.........$23,264	31-7-05	$1 for year ended 31-7-1905............	4-9-05	7	$14
International Cotton Manufacturing Co., Ld.	1895	T750,000	(6) 10,000	T75	T75	T100,000	.........T18,718	30-9-05	Interim of 3% a/c 1898..................	30-4-98	—	T44 buyers
Laou-kung-mow Cotton Spinning & Weaving Co., Ld.	1895	T800,000	(7) 8,000	T100	T100	none	.........T10,000	31-12-04	Interim of 4% a/c 1898 on 6,000 shares	1-8-98	—	T60 sellers
Soey Chee Cotton Spinning Co., Ld.....	1895	T1,000,000	2,000	T500	T500	T5,658	.........T22,051	31-12-04	4% for 1897.....................................	2-2-88	—	T250 buyers
Miscellaneous.												
Anglo German Brewing Co., Ltd.	1904	$100,000	4,000	$100	$100	none	................$20	31-12-04	None...	—	—	$100
Bell's Asbestos Eastern Agency, Ld......	1895	£5,377.10s	8,604	12/6	12/6	£314	............£770	31-12-04	1s. 3d per share for 1904..................	21-7-05	10	$6½ sellers
Campbell, Moore & Co., Ld................	1886	$12,000	1,200	$10	$10	$8,000	...........$1,182	31-12-04	$3 for 1904	1-4-05	8¼	$36
China-Borneo Co., Ld........................	1903	$720,000	(8) 60,000	$12	$12	none	—	31-12-04	$1 for 1904	17-3-05	10	$10 sellers
China Flour Mill Co., Ld.	—	T200,000	4,000	T50	T50	T30,000	.............T718	31-12-04	Interim of T5 for 1905	24-7-05	—	T80 sellers
China Light and Power Co., Ld.	1901	$500,000	50,000	$10	$10	none	...........$3,739	29-2-04	804 for 1905.....................................	22-1-06	9	$9 sales
China Provident Loan and Mortgage Co., Ld.	1898	a $1,000,000	100,000	$10	$10	$80,000	...........$1,581	31-12-04	80 cents for 1904............................	18-1-05	9	$9 sales
Dairy Farm Company, Ld..................	1896	$187,500	25,000	$7½	$6	$25,000	...........$2,864	31-7-05	$1.20 for year ending 31-7-1905......	24-11-05	7¾	$15½

STOCK	WHEN ESTABLISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation* PER CENT	CLOSING QUOTATIONS
Miscellaneous.—Continued												
Green Island Cement Co., Ld.	1889	$1,500,000	150,000	$10	$10	p $400,000 / $500,000	$95,054	31-12-04	$2 for 1904	27-2-05	7	$29 buyers
Hall & Holtz, Ld.	—	$420,000	21,000	$20	$20	$186,000	$7,551	29-2-05	Final of $1½ making $2½	15-4-05	9½	$6 sales
Hongkong Electric Co., Ld.	1889 / 1899	$600,000	30,000 / 30,000	$10 / $10	$10 / $10	none	$2,151	30-4-05	$1.00 / 50 cents for year ending 30-4-05	17-7-05	6½ / —	$15½ buyers / $15 buyers
Hongkong High-Level Tramways Co., Ld.	1887	$125,000	1,250	$100	$100	$50,000	$2,796	30-11-04	$15 for year ending 30-11-04	24-12-04	7	$225
Hongkong Ice Company, Ld.	1881	$125,000	5,000	$25	$25	k $60,000	$5,356	31-12-04	Interim of $4 for 1905	2-8-05	6¾	$250
H'kong Rope Manufacturing Co., Ld.	1883	$500,000	10,000	$50	$50	$60,000	$11,137	31-12-04	$10 for 1904	10-4-05	7	$152 buyers
Hongkong Steam Waterboat Co., Ld.	1900	$150,000	15,000	$10	$10	$2,500	$88	30-9-05	Final of 50 cents making $1 for year ended 30-9-1905	24-11-05	7¾	$12
Lane, Crawford & Co., Ld. (Shanghai)	1903	$250,000	2,500	$100	$100	none	$42,009	29-2-05	Interim of $5	20-11-05	9½	$145
Maatschappij tot Mijn-, Bosch-en Landbouwexploitatie in Langkat	1902	Gs.2,500,000	25,000	G.100	G.100	i T528,210 / T19,465	T35,849	31-10-04	4th quarterly dividend of T7½ making in all T22½ for '05	15-12-05	9½	T235 selllers
Mondon, (E. L.) Ld.	1902	T350,000	7,000	T50	T50	none	*Dr.* T117,638	31-12-04	T5 for 1902	2-5-03	—	T25 sellers
Philippine Company, Ld.	1904	$675,000	67,500	$10	$10	none	*Dr.* P53,619	31-12-04	None	—	—	$5 buyers
Shanghai and Hongkong Dyeing and Cleaning Co., Ld.	1903	$60,000	1,200	$50	$50	none	*Dr.* $16,455	31-8-05	None	—	—	$50
Shanghai Gas Co., Ld.	1903	T800,000	16,000	T50	T50	d T145,000 / T108,172	T8,011	31-12-04	Interim of T3½ for 1905	26-7-05	7	T128 sales
Shanghai Horse Bazaar Co., Ld.	1904	T270,000	5,400	T50	T50	T45,000	T9,751	31-12-04	T6 for 1904	17-3-05	9	T67½ buyers
Shanghai Pulp and Paper Co., Ld.	—	T450,000	4,500	T100	T100	T25,000	T6,968	31-12-04	Interim of T6 for 1905	22-7-05	9	T150 sales
Shanghai Sumatra Tobacco Co., Ld.	1902	T600,000	(9) 30,000	T20	T20	w T24,820 / T25,000	T1,297	31-10-04	Interim of T2	20-10-05	14	T62 sellers
Shanghai Waterworks Co., Ld.	1881	£144,000	7,200	£20	£20	T170,000	T17,220	31-12-04	Interim of 15/- for 1905	27-7-05	4½	T460
South China Morning Post, Ld.	1903	$150,000	6,000	$25	$25	none	*Dr.* $5,068	29-2-05	None	—	—	$20
Steam Laundry Co., Ld.	1902	$100,000	20,000	$5	$5	none	$1,134	31-5-05	50 cents for year ended 31-5-05	20-11-05	8¼	$6 sales
Straits Ice Company, Ld.	1884	$200,000	2,000	$100	$100	$25,000	$700	31-12-04	$5 account 1905	...-2-05	—	$160 buyers
Tientsin Waterworks Co., Ld.	1901	T. T200,000	2,000	T. T100	T. T100	e T15,259 / T4,000	T1,012	30-4-05	Final of T4½ making T8½ for '04/5	17-6-05	7½	T. T105
United Asbestos Oriental Agency, Ld. / Do. do (Founders')	1896	$100,000	9,900 / 100	$10 / $10	$4 / $10	$22,000	$551	31-5-05	80 cents / $19.80 for year ended 31-5-05	29-7-05	9 / 11	$9 / $180
Watson (A. S.) & Co, Ld.	1886	$900,000	90,000	$10	$10	$300,000 / $25,000	$6,096	31-12-04	Final of 50 cents making $1 for '04	29-5-05	7¾	$13
William Powell, Ld.	1901	$150,000	15,000	$10	$10	e $4,500	$676	30-6-05	Interim of 50 cents for 1905	25-11-05	11	$11

LOANS AND DEBENTURES	AGENTS FOR THE LOAN	AMOUNT OF LOAN	PAR VALUE	OUT-STAND'G BONDS	WHEN PAYABLE	CLOSING QUOTATIONS
China Government, 7 per cent. Silver Loan 1886 E.	Hongkong & Shanghai Bkg. Cor.	T767,200	T250	1969	Mar. 31st & Sept. 30th each year until Mar. 31st, 1917	par.
Hongkong Hotel Co., Ltd., 6% Mortgage Debentures of 1899‡	Hongkong & Shanghai Bkg. Cor.	$500,000	$500	§ all	Half yearly, June 30th and December 31st	par.
Shanghai & Hongkew Wharf Company, Ltd. 6% Debentures of 1902	Hongkong & Shanghai Bkg. Cor.	T543,900	T100		Half yearly, June 30th and December 31st	T97
Astor House Hotel Co., Ltd. 8% Debentures of 1903	Hongkong & Shanghai Bkg. Cor.	T500,000	T100		Half yearly, January 1st and July 1st	T104
Chinese Engineering & Mining Co., Ltd., 6% Debentures of 1903†		£500,000	¶	£431,960	Half yearly, June 30th and December 31st	par.
International Cotton Manufacturing Co., Ltd. 6% Debentures of 1901	Russo Chin. Bk.	T500,000	T100		Half yearly, March 31st and September 30th	par.

(Closing quotations: Plus accrued interest)

a Auhorized capital $2,000,000
b Building Reserve Account.
c Capital Reserve Fund.
d Depreciation Fund.
e Equalization of Dividend Fund.
f Exchange and Investment Fluctuation Account.
g Gold Reserve Fund
h Exchange Reserve Account.
i Insurance Fund.
j Reinsurance Fund.
k Contingencies Account.
l Legal Reserve Fund.
m
n Sinking Fund.
o
p Premium on New Issue.
q
r Repairs and Renewals Account.
s Silver Reserve Fnnd.
t
u Underwriting Suspense Accoount.
v
w Special Works Funds.
x Extra Reserve Fund.
y 75,000 owned by the Company
z 6,000 shares unissued.
1 5725 shares unissued.
2 First issue of 60,000 of which 10,411 unallotted.
3 785 shares unissued.
4 7,600 shares unissued.
5 5,000 shares unallotted.
6 1.616 shares unallotted.
7 842 shares unissued.
8 14,000 shares unissued.
9 17,000 shares unissued.
* Based on last year's dividend.
‖ Only Tls. 134,000 taken up.
§ 268 held by the Company.
¶ In certificates of £20 and £100
‡ Redeemable in 10 years, or at option of Company the Company giving 6 months' notice.
† Redeemable at par at rate of £10,000 per annum from 31st December,
Dr. Deficit.

SINGAPORE SHARE QUOTATIONS.

Courtesy Messrs. Fraser & Co., Brokers, Singapore, February, 1906.

NAME	DATE OF FORMATION	CAPITAL	CAPITAL PAID UP	NO. OF SHARES	ISSUE VALUE	PAID UP	RESERVE	LAST DIVIDEND	SINCE LAST MAIL HIGHEST	SINCE LAST MAIL LOWEST	CLOSING QUOTATIONS
Mining.									$	$	$
Bersawah Gold Mining Co., Ltd.	1900	$175,000	140,000	10,000 [1]	10	10					15.00 sellers
" " " " " *Deferred.*				4,000	10	10					8.00 sellers
Bruseh Hydraulic Tin Mining Co., Ltd.	1901	$600,000	600,000	60,000	10	10					9.15 sales
Kadana Gold Mining Co., Ltd.	1901	$300,000	300,000	20,000	10	10					2.00 sellers
" " " " " *Pref.*				10,000	10	10					10.00 nominal
Kechau Goldfields, Ld. *Fully paid*	1902	£30,000	16,175.7/-	6,207	1	1					in liquidation
" " " *Contrib.*				10,493 [2]	1	19/-					in liquidation
Kuantan Tin Mining Co., Ltd.	1905	$150,000	99,000	9,900 [3]	10	10					12.00 buyers
Pahang Corporation, Ltd.	1889	£250,000	244,306	244,306 [4]	1	1	20,000	3 per cent for year ending 30-6-02			2.00 sellers
Pahang Kabang, Ltd.	1890	£375,000	375,000	360,000	1	1					0.25 sellers
" " " *Pref.*				15,000	1	1					...... nom.
Queensland Raub G. M. Co., Ltd. *Fully paid*	1901	£146,700	100,866	36,700	1	1					...... nom.
" " " " *Contrib.*				110,000	1	11/8					...... nom.
Raub Aust. Gold Ming. Co., Ltd. *Fully paid*	1892	£200,000	191,250	50,000		1	4,873	1s. paid January, '01			3.25 buyers
" " " " *Contrib.*				150,000	1	18/10		1s. " " "			3.25 buyers
Redjang Lebong Mining Co.	1898	f.2,000,000	1,800,000	18,000 [5]	100	100		22 9-10% for year ending 31-12-04			440.00 ......
Royal Johore Tin Mining Co., Ltd.	1900	$220,000	220,000	22,000	10	10		5 " for year ending 15-2-04	3.50	3.00	3.50 sales
Sipiau Tin Co., Ltd.	1899	$230,000	230,000	23,000	10	10		5 " for ½ year ending 30-6-05	6.50	6.00	6.50 ......
The Belat Tin Mining Co., Ltd.	1903	$300,000	300,000	30,000	10	10					4.50 sellers
The Pusing Lama Tin Mines, Ltd.	1904	£120,000	98,000	98,000 [6]	1	1			11.65	11.15	11.15 sellers
Tronoh Mines, Ltd.	1902	£160,000	149,185	149,185 [7]	1	1		7s. paid during 1905	20.25	20	20.00 sales & sellers
Duff Development Co., Ltd.	1903	£400,000	350,000	350,000 [8]	1	1					8.00 sellers
Rubber.											
Anglo-Malay Rubber Co., Ltd.	1905	£150,000	140,000	140,000 [9]	1	1					
Balgownie Rubber Estate Ltd.	1905	$200,000	100,000	20,000	10	5			10.00	8.75	$10
Batu Caves Rubber Co. Ltd. *Fully paid*	1904	£30,000	11,125	7,000 [10]	1	1					....
" " " " *Contrib.*				11,000	1	7/6					....
Bukit Rajah Rubber Co. Ltd *Fully paid*	1903	£70,000	59,250	55,000 [11]	1	1					£3 10s. od. ......
" " " " " *Contrib.*				7,000	1	15/-					£3 5s. od.
Cicely Rubber Estates Co.	1904	£12,000	10,500	6,000	1	1					£2 5s. od.
" " " 5% Pref.				6,000	1	15/-					£2 5s. od. ......
Consolidated Malay Rubber Estates, Ltd.	1905	£75,000	55,000	55,000 [12]	1	1					£1 17s. 6d. ......
Sione Rubber Company, Ltd.	1905	$100,000	88,000	8,800 [13]	10	10			16.00	15.00	$15.75 sales
Sungei Way (Selangor) Rubber Co., Ltd.	1904	£50,000	15,670	6,920 [14]	1	1					£2 0s. od. buyers
" " " " *Contrib.*				35,000	1	5/-					£1 4s. od. ......
The Batu Unjor Rubber Co., Ltd.	1905	$700,000	610,000	61,000 [15]	10	10					$25.00 sales
The Pataling Rubber Estate Syndicate	1903	£30,000	20,000	20,000 [16]	1	1					£5 5s. od. ......
The Ribu Planting Co., Ltd.	1904	$200,000	135,000	1,350 [17]	100	100					$270.00 ......
The Sandycroft Rubber Co.	1904	$100,000	85,000	850 [18]	100	100			227.50	225.00	$227.50 sales
The Selangor Rubber Co., Ltd.	1898	£30,000	26,300	26,300 [19]	1	1					£7 15s. od. ......
The Singapore & Johore Rubber Co., Ltd.	1903	$100,000	91,500	150	100	100					$160.00 sales.
" " " " " " *Contrib*				850	100	90					$150.00 sales.
Vallambrosa Rubber Co.	1904	£60,000	50,000	50,000 [20]	1	1					£5 0s. od. ......
General.											
Fraser & Neave, Ltd.	1898	$225,000	225,000	4,500	50	50	112,500	10 p. ct. and 2½ per cent bonus for '04	102.00	101.00	102.00
Hogan & Co., Ltd.	1904	$480,200	334,800	3,348 [21]	100	100	5,000	7 per cent for 1904			40.00 sellers
H'kong and Shanghai Banking Corporation	1865	$10,000,000	10,000,000	80,000	125	125	10,000,000 [25] 9,500,000 [26] 250,000 [27]	35s. and 20/- bonus for ½ year ending 31-12-05			800.00 buyers
Howarth Erskine, Ltd.	1901	$1,200,000	1,200,000	12,000	100	100	275,000	10% and 5% bon. for yr. end. 30-6-05.			270.00 sellers
Maynard & Co., Ltd.	1901	$34,000	34,000	3,400	10	10		15 p. ct. for year ending 31-10-05			23.00 sellers
Riley, Hargreaves & Co., Ltd.	1899	$875,000	875,000	6,000	100	100	150,000	10 p. ct. and 2½ p. ct. bon. for year '04			195.00 ......
" " " " 7% Pref.				2,750	100	100		7 p. ct. for year 1904			115.00 buyers.
Singapore Cold Storage Co., Ltd.	1903	$600,000	240,000	24,000 [22]	10	10					10.00 sales
Singapore Dispensary Ltd.	1891	$30,000	30,000	600	50	50	19,000	12½ per cent for year ending 31-7-04	75.00	70.00	70.00 sellers
Straits Ice Co., Ltd.	1884	$200,000	200,000	2,000	100	100	22,000	5 " interim for 1905			160.00 ......
Straits Steam Ship Co., Ltd.	1890	$500,000	421,500	5,000 [23]	100	100	400,000 169,228 [28]	5 p. ct. interim for 1905			150.00 sales
Straits Trading Co., Ltd.	1887	$3,000,000	2,500,000	250,000 [24]	10	10	700,000 1,021,395 [29]	10 p. ct. & 5 p. ct. bon. ½ yr. end. 30-9-05			42.25 sales
Tanjong Pagar Dock Co., Ltd.	1864	$3,700,000	3,700,000	37,000	100	100	1,950,000	$6 for half year ending 31-12-05			475.00 sellers
Debentures. $											
Howarth Erskine Ltd. 7 per cent ... 250,000											3 per ct. prem. buyers
Singapore Municipal 6 " ... 400,000											1 ,, prem.
" " 5 " ... 1,878,000											par buyers
" " 4 " ... 602,300											2 ,, dis. nominal
Riley, Hargreaves & Co., Ld. 6 p. cent 225,000											1 ,, prem buyers
Tanjong Pagar Dock Co., Ld. 6 " 250,000											1 ,, prem buyers
" " " " 5 " 1,365,500											par buyers

1 3,500 unissued.
2 13,300 "
3 5,100 "
4 5,694 "

6 22,000 unissued
7 10,815 "
8 50,000 "
9 10,000 "

11 9,000 unissued
12 20,000 "
13 1,200 "
14 8,080 "

16 10,000 unissued Mort. £5,000
17 650 "
18 100 "
19 3,700 "

21 1,454 unissued.
22 36,000 "
23 785 "
24 50,000 "

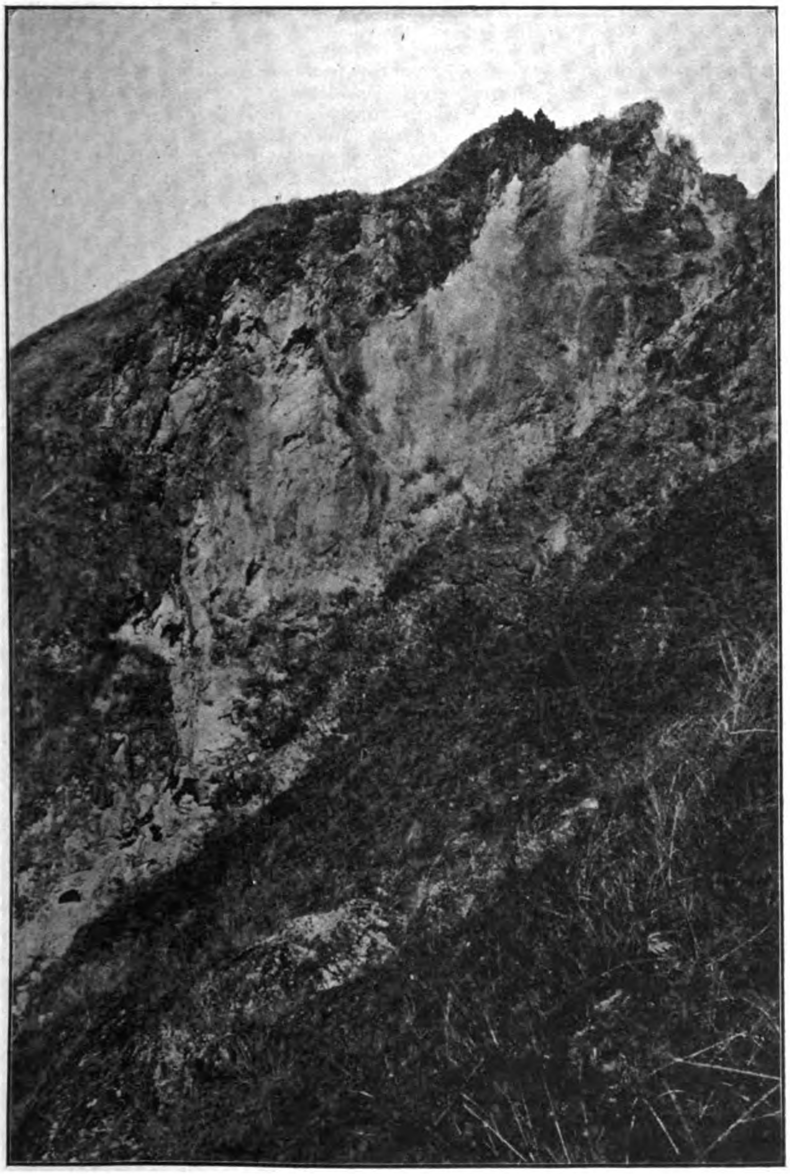
26 Silver Reserve Fund.
27 Insurance Fund.
28 Sundry Reserves.
29 Sundry Reserves.

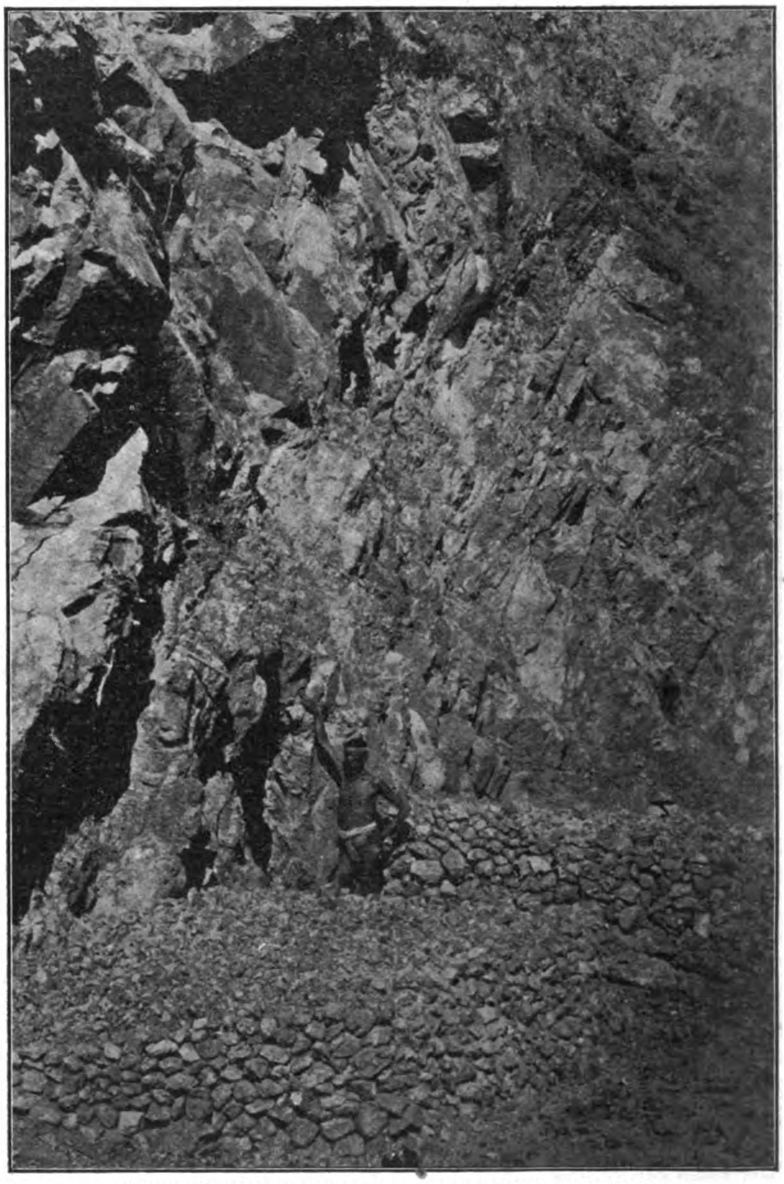
THE FAR EASTERN REVIEW
COMMERCE ENGINEERING FINANCE

VOL. II. MANILA, P. I., SHANGHAI, AND YOKOHAMA, MARCH, 1906. No. 10.

ANOTHER YEAR'S PROGRESS IN THE MINERAL DEVELOPMENT OF THE PHILIPPINE ISLANDS

The sixth and last annual report of Mr. H. D. McCaskey as chief of the Mining Bureau of the Philippine Islands, now incorporated as a division of the Bureau of Science, which has just been published, is a most interesting document and contains an abundance of valuable information covering the mineral resources and the mining prospects in this archipelago. Mr. McCaskey expresses the belief that the outlook for a profitable mineral industry in the Philippines is more hopeful today than it has been any time since American occupation. An increasing interest is being shown in mineral claims, and capital will probably be more readily obtained in the future than it has been in the past, particularly if the congress at Washington will immediately make a liberal modification of the mining laws of the Islands, which there is sincere hope will be done during the present session of the national legislators. Mr. McCaskey expresses the belief that the law of the *survival of the fittest* has held good in these Islands, as elsewhere, in the mining industry, and that the most promising mining claims heard of today are many of them worthy of serious consideration.


IGOROT GOLD WORKINGS, ANTAMOK RIVER, BENGUET, LUZON


"COPPER KING" DEPOSITS, BUED RIVER, BENGUET

Much activity in prospecting and development work was shown in several districts during the period under review, modern machinery has been arriving from the United States, and more of it has been ordered and is expected to arrive at a very early date.

Mining development, or prospecting, are now being carried on in the provinces of Lepanto-Bontoc, Benguet, Pangasinan, Nueva Ecija, Bulacan, Rizal, Batangas, Tayabas, Ambos Camarines, Albay, Masbate, Cebu, and Mindanao.

(Continued on page 270.)

THE FAR EASTERN REVIEW

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PUBLISHER AND EDITOR

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A MONTHLY REVIEW OF FAR EASTERN TRADE, FINANCE, AND ENGINEERING. DEDICATED TO THE INDUSTRIAL DEVELOPMENT AND ADVANCEMENT OF TRADE IN THE PHILIPPINES AND FAR EASTERN COUNTRIES.

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MANILA, SHANGHAI, AND YOKOHAMA, MARCH 1906

MINERAL DEVELOPMENT OF THE PHILIPPINES

There is much that is of interest to mining engineers and prospectors, who have been laboring to bring to the surface the hidden mineral wealth of the Philippine Islands, in the last annual report Mr. H. D. McCaskey is likely to make as chief of the Mining Bureau of the insular government. In this document Mr. McCaskey not only pays a high and deserved tribute to those gentlemen who have so ably assisted him in exploration work, but expresses in strong words of appreciation his regard for the miners who have cast their lot in this field of labor. Mr. McCaskey hopes and believes "that the sturdy pioneers who have blazed the trail through many a heart-breaking day in fever swamp, jungle, and forest, during years of peril and privation, the full tale of which will never be told, will yet come into their own, and through them that the mineral industry of the Philippines will prove an important factor in the development of prosperity and progress under American rule." Mr. McCaskey shows that on the whole the mineral industry of the Islands has steadily grown, and while he is optimistic of the future he insists that much depends upon more liberal mining laws, and the settlement of the labor and transportation problems. He believes in the worth of Filipino labor, but he admits there is any amount of difficulty yet to be overcome before the native can be brought around to realize the great benefits which accrue to the individual and the country-at-large, in the rounding out of a career of industry.

We find in Mr. McCaskey's report mention of nearly every valuable mineral known to the mining world, so the fact that these minerals exist here is indisputable. The period of misgivings and doubt as to the extent of the deposits, and their value, are a thing of the past. Time and capital, backed by modified laws, are now the only requisites lacking for rapid mineral development.

Probably the most important work done by miners during the period covered by Mr. McCaskey's report has been the development of the commercial value of Philippine coal. A number of coal mines have been opened, and impartial tests of their product seem to indicate that it is equal, if not superior, in grade and quality, to either Australian or Japanese coal. This encouraging feature of the field work performed by Mr. McCaskey and his assistants, with the help of private miners, seems to have brought out promises of much commercial benefit in years to come.

Gold, copper, and iron are being developed with most satisfactory results, which, while promising no bonanza, indicate to a certainty the future importance of these minerals in the industrial development of the Islands.

Surprising economy marked the conduct of the old Mining Bureau by Mr. McCaskey, and with all due regard for the officials who found it necessary on the ground of economy to consolidate the bureau with others in the Bureau of Science, we believe a serious mistake has been made. We have always felt a certain interest akin to pride in the Mining Bureau, and we have never been able to agree with others that wisdom was shown in its abolition. We believe the mineral resources of the Islands are of sufficient importance to warrant the maintenance of a separate bureau from which to develop them. If we are in error in arriving at this conclusion our ignorance of the value of mining in the development of a country has misled us. Agriculture and forestry have escaped contraction in the reorganization of the governmental departments and bureaus, and this being a fact we believe that mining and the mineral resources have received a serious setback in their not being kept absolutely and intactly separate and distinct for any other branch of the government. It is true that the consolidation in the Bureau of Science will make it more convenient for the laboratory work required in the mining division, but the results, we are afraid, will be harmful to the industry. We sincerely hope the government will reconsider this feature of the reorganization and give to the mining industry the recognition and impetus it deserves by detaching it as a separate bureau of the public service at a very early date. This is what miners are hoping for, and it is a concession they are entitled to.

AMERICA'S ORIENTAL TRADE

According to a memorandum issued by the Bureau of Statistics of the Department of Commerce and Labor at Washington, no feature of the export trade of the United States in 1905 has shown a larger growth than that of the trade with China and Japan, and this, in the case of China, despite the general boycott movement, which, while nearly all foreign interests felt its effect, was and yet is most severe against Americans. In 10 mos. ended with October, exports to China were more than $50,000,000 gold in value, against $20,000,000 in the same mos. of 1904 and $13,000,000 in the corresponding mos. of 1903; and those to Japan were $46,500,000 against a little less than $22,000,000 for the same period in 1904 and $16,000,000 in the corresponding mos. in 1903.

Increase in exports from the United States to each of these countries occurred in a large proportion of the articles of export to the Far East. To China the growth was especially marked in copper, cotton cloths, flour, sewing machines, locomotives, paper, canned beef, manufactures of tobacco, and lumber, though cotton cloth and copper were by far the most important of these items. To Japan the growth occurred in flour, carriages and other vehicles, raw cotton, electrical machinery, sewing machines, locomotives, leather, paper, canned beef, tobacco, and lumber.

Copper exports to China are a comparatively new feature of United States trade with that country, the amount in 10 mos. ended with last October having been $11,326,407 gold, against $611,677 in the same mos. of 1904. This copper is used in manufacturing the new copper coins, of which 1,693,000,000 pieces of a nominal value of about ½ cent each were coined in 1904.

To Japan the increase occurs in raw cotton, of which the exports in 1905 were 138,521,618 lbs., against only 23,499,526 lbs. in the same mos. of 1904 and 32,951,175 lbs. in 1903. The value of the cotton exports to Japan in the 10 mos. ended in October, 1905, was $13,784,399 gold, against $2,716,529 in the same mos. of 1904 and $3,214,427 in 1903.

CHINESE LABOR IN THE TRANSVAAL.

On other pages of this issue of THE REVIEW appears a very interesting description of the manner in which coolies have been collected in China and prepared and transported to the Transvaal, under contract, to labor in the gold mines of the Witwatersrand District. Appearing as it does right at this time when the question of indenturing this labor has developed into a bitter political hullabaloo in Great Britain, we believe the article should have great weight in favor of a continuation of the system, which, it would seem, has for the present been abandoned. The article appears practically in the form of an official report made by Mr. Ragsdale, American consul-general at Tientsin, to Washington. It exhausts the subject so far as the system of exportation from China is concerned, and its tenor throughout is highly complimentary to the contractors who have undertaken to secure the laborers for the Transvaal Chamber of Mines, and to the other parties interested in the scheme. If the same humane and business-like methods which have characterized the work in China, have been adhered to in the Transvaal—which we believe to be a fact—we can see no reason why the people of Great Britain should have seized upon the cry of "slavery," set up by the political enemies of the Balfour Government, to help them secure control of the government. However, it appears, according to Mr. Balfour's own admission, that this same labor problem was the cause of the downfall of his ministry. Now, we have no intention of discussing the political phase of the proposition. We will leave the British politicians to denounce the indenturing of coolies as "slave trading" or whatever else they may choose to call it, and turn to the causes which forced the mine operators of the Rand to seek labor in a foreign land.

Mr. Ragsdale tells us about this in his report. He tells us that the climate of South Africa is such that it is impossible for the mine operators to secure white men as laborers, because the latter can not sustain themselves on the wage they earn and uphold their self-respect. The Kaffir and other natives of Africa have been tried and have failed on account of their indolence and absolute disinclination to work. After many dis-

heartening attempts to solve the labor problem, and only after the gold-mining industry of the Transvaal had dropped to the lowest ebb, the mine operators turned to China with her teeming millions of coolies for relief. The result was the indenturing, under most liberal regulations, of the coolie. Mr. Ragsdale tells us about the inception of the movement, the methods of collecting, detention, and examination, and the transportation of these laborers. The details are very interesting to every man or set of men interested in Oriental labor, and we believe Mr. Ragsdale has not departed from the bounds of conservative observation in what he has written.

Our esteemed friend, the *South China Morning Post*, believes that the good people of Great Britain have displayed gross ignorance of the whole transaction in letting the "slavery" bugaboo influence them in their recent general elections, and says that the "British view of the coolie labor—as interpreted by and during the general elections—is a nauseating and insulting one to the educated Chinaman, who has some shred of patriotism and respect for himself and his nationals," because the whole scheme of indenturing the coolies had the hearty support and coöperation of the Peking Government. Besides, this paper has "cogent and conclusive facts" before it as to the vital need of the perpetuation of the present system if South Africa is to flourish as one of Great Britain's most wealthy possessions, and these facts follow:—

"Recently the Chamber of Mines at Johannesburg issued a memorandum showing the dependence of the gold industry on Chinese labor. The following figures represent the immediate development of the industry which is contemplated if more labor is available during the next 12 mos., but for which no orders will be given if no more Chinese are imported. Stamps to be erected, 3,740; value of plant and machinery incidental thereto, £10,103,207; value of spare parts of machinery, stores, and supplies required in connection with the above during the first yr. after completion, £2,180,661; number of additional European skilled laborers employed, 5,912; annual local expenditure, £5,918,424. These figures indicate the loss to the industry and to the community in general which would be entailed by an abandonment of the work for which provision has been made in expectation of a steady supply of coolie labor. If the importation of Chinese were suspended, and those already in the country or due were repatriated, the actual losses are estimated as follows:—Stamps hung up, 3,135; value of plant and machinery incidental thereto, £11,235,756; skilled whites dismissed, 6,405; decrease of local expenditure, £6,636 327. The chamber further points out that the December output of gold was obtained from the working of 7,335 stamps. If 3,135 stamps were hung up, the output would be reduced approximately 40 per cent. The facts speak for themselves. The retention and expansion of white labor rests on the amount of coolie labor procurable, and this statement has been amply corroborated this week by a gentleman who is employed in Johannesburg, and who definitely asserted to us that in the influx of coolie labor alone was vested the future of South Africa and the development ot the mining industry."

THE ORIENT AND SOUTH AMERICA

The Toyo Kisen Kaisha (Oriental Steamship Company) has ordered two steamers of over 13 000 tons to be built at Nagasaki, ostensibly for its South American line recently established. It is more than probable, however, that when these large ships are finished they will be berthed in the San Francisco service, and that the three Toyo Kisen Kaisha vessels now on that route will run to South America. The keel of one of the 13,000 ton ships has already been laid, and both are expected to be completed in 2 yrs. Until it has steamers of its own, the company will employ chartered vessels, the first one to be placed on the run being *Glenfarg*, a British bottom.

The route is from Hongkong *via* Japanese ports to Honolulu and San Francisco; and then to Panama, Guayaquil, Callao, and Iquique. The list of ports of call will depend much upon the business offering and the route on the return voyage will be determined by the quantity of freight secured. It may be direct, with a call for coaling at Honolulu, or it may include stopping for passengers or freight in Mexico, or even at San Francisco. Chinese goods and passengers for South America will be largely counted upon for business, as it is thought that a great number of Chinese laborers will go to Peru in the near future. Nitrates, for fertilizers, and Peruvian sugar are the main return cargoes anticipated.

La Compagnie Francaise des Chargeurs Reunis recently despatched its first steamer, advertised to go to Europe *via* the Straits of Magellan and Buenos Aires. Among her cargo were a miscellaneous lot of Japanese goods for Argentina. This company advertises a bimonthly service to be maintained by five new ships, each of 5,416 tons. Announcement is made that this line also is not fully organized. The proposed route is from Antwerp *via* Mediterranean ports and Suez to Singapore, Hongkong, Yokohama, Honolulu, San Francisco, Panama, the ports of the W. coast of South America and *via* the Straits of Magellan to Rio de Janeiro. The return voyage will be across the Atlantic Ocean to Antwerp. It is understood that the French company has a promise of about 2,000 tons of copper per month as cargo from Peru to Europe, and that is its main dependence in initiating the service.

Hitherto there has been no considerable trade between Japan and South America, but interest in the commercial possibilities, according to Secretary Wilson of the American Legation at Tokyo, is now being rapidly awakened. The Argentine representative at the Japanese capital has suggested to his government the establishment of a museum of Argentine merchandise at Tokyo. It is not unlikely that an important commerce between Japan and the countries of South America may follow this opening of cheaper communication. The Japanese expect to find a market there for manufactured silk, matting, straw braid, straw hats, porcelain, fans, paper, matches, bamboo articles, lacquerware, wooden manufactures, etc. South American articles of export which may find a return market in Japan are leather, hides, cotton, wool, nitrates, sugar, fodder, and wheat.

The starting of regular Japanese lines to South America indicates the far-reaching commercial enterprise of the Japanese in their determination to have a merchant marine of the first magnitude. With a large seafaring population, low wages, cheap coal, and liberal government subsidies to steamship companies, the Japanese will reach out for a good share of the lucrative carrying trade of the world.

MORO PROVINCE ILLUSTRATED

THE FAR EASTERN REVIEW has in course of preparation a special edition of the paper which will be devoted exclusively to the Moro Province of the Philippine Islands, which country is, today, the Mecca in this archipelago for white settlers. The progressive administration of the Government of the Moro Province has given an impetus to the development of its resources and commerce which promises for the people general prosperity; and this, combined with the natural richness of the country, should be a temptation to white settlers. Our special edition will deal entirely with the progress of provincial engineering improvements under American rule, the agricultural, mineral and forestry resources of the country, and the upbuilding of commerce and trade among the people. The edition will be profusely illustrated and will contain a fund of most interesting reading matter and data pertaining to every phase and condition of the country and its possibilities. In order to make the edition absolutely reliable in every particular we commissioned Mr. J. L. Travis, an experienced newspaper writer, to cover the field. He has been in the Moro Province for more than 2 mos., and before he finishes his work will have visited every "nook and corner" of the land and made personal and accurate investigation of every feature the special edition will seek to cover.

The Moro Province edition will number more than 10,000 copies and will be circulated only on special order. It will be published not later than May 15th. Price 25 cts. gold per copy, mailed to any address in the Postal Union. All orders should be sent to the publication office of THE FAR EASTERN REVIEW, Manila, P. I.

PHILIPPINE AGRICULTURE MENACED

We are informed on reliable authority that the rigid enforcement of insular customs and coastwise laws, wherein, it seems, the pound of flesh has been indiscriminately exacted, has forced the manager of the great agricultural implement and machinery depôt of The Kelly-Springfield Road Roller Company, in Manila, to abandon this city as headquarters, in favor of Hongkong. We hope Mr. W. Cameron Forbes, Secretary of Commerce and Police, will give this matter his immediate attention and, if possible, neutralize difficulties to the end that the Kelly-Springfield people may not be forced to withdraw their agency. What this country needs more than anything else is agricultural machinery. Realizing this and satisfying themselves that there was a splendid field here for their manufactures, the Kelly-Springfield people, who are in reality a combination of 13 of the largest American machinery manufacturing concerns, at an expenditure of thousands of dollars, shipped many tons of their best agricultural implements to this city to be placed in the farming and planting districts of the Philippines. Their exhibition depôt is a magnificent institution, and it seems to us that it would be a pity were we compelled to lose the agency for the sake of upholding letter-perfect interpretations of law. The crying needs of agriculture should first appeal to the government, not taking into least account the harmful effect the withdrawal of the Kelly-Springfield agency will have upon manufacturers of the United States with reference to Manila. We understand that Mr. Helvie is now negotiating for warehouse accommodations in Hongkong with a view to removing his machinery at an early date. We trust the government will put a stop to this proceeding before it reaches a point where reconsideration by Mr. Helvie will be impossible.

PUBLICATIONS, CATALOGS, ETC.

PROBSTHAIN & CO., LONDON.—Messrs. Probsthain & Co., Oriental publishers and booksellers of 14 Bury-st, London (W. C.), inform us that they will issue immediately a new and revised edition of J. E. de Becker's *Nightless City* (Yokohama). This book is the most complete and reliable history of the so-called Flower Quarters of Japan, especially of the Yoshiwara. It will contain numerous and beautifully-colored plates, collotypes, and woodcuts, and the edition is strictly limited. (Price 30/- shillings).

E. C. MCCULLOUGH & CO., INC., MANILA.—This general printing and engraving concern has just issued a splendid illustrated catalogue of the stationery, blank books, paper, desks and office furniture, safes, and other articles it handles. Mailed to any address on application.

THE DAVID MAYPOLE HAMMER COMPANY, NORWICH, N Y., U. S. A.—The famous Maypole hammers are illustrated in colors and exhaustively described in a very neat catalog which accompanies a little book containing the story of the career of David Maypole, inventor of the adz-eye hammer.

THE CRANE COMPANY, CHICAGO.—We are in receipt of the advance catalog circulars of this company which describe with numerous accompanying illustrations its machinery products.

ANOTHER YEAR'S PROGRESS IN THE MINERAL DEVELOPMENT OF THE PHILIPPINE ISLANDS

(Continued from page 267.)

LEPANTO-BONTOC.—In Lepanto, in the copper district of Mancayan, about 40 claims, including the Santa Barbara and Sin Nombre *pertenencias* of the Spanish *régime*, all now located under the present mining laws, have been reported as having been secured as an option by agents of a New York syndicate. The old Spanish workings have uncovered large bodies of high-grade copper ore on the Santa Barbara and Sin Nombre claims, and it is anticipated that much systematic exploration work will be done upon the adjoining properties upon the arrival of the syndicate engineer. In Suyoc, just S. of Mancayan, some important prospects are being developed by American miners at the present time. Gold and copper ores both occur here. Analyses at the government laboratories show four samples of Mancayan ores, collected by Mr. A. J. Eveland, geologist, Mining Bureau, to contain, respectively, 13.93, 16.5, 9.7, and 32.9 per cent in copper, and $4.75, $3.31, $1.65, and $0.85 to the ton in gold. The ores are "gray copper" ores, chiefly tetrahedrite, tennantite, enargite, and luzonite.

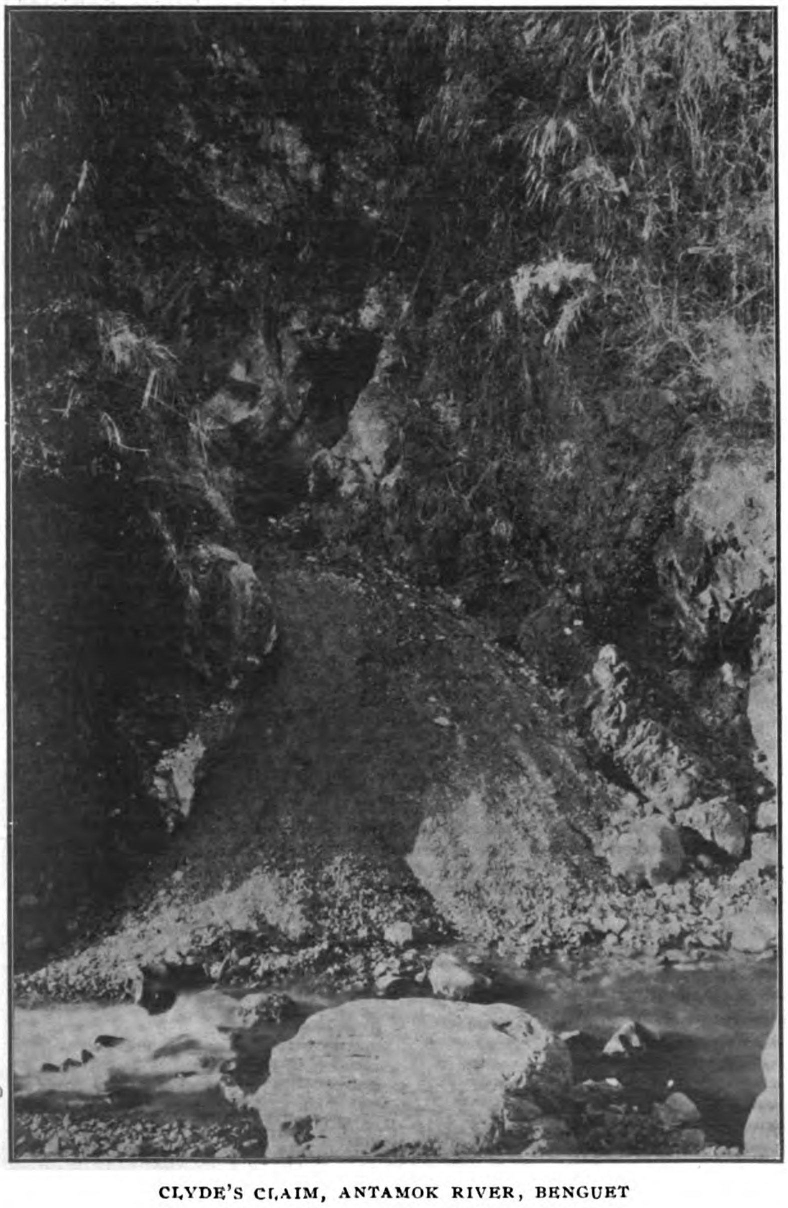
The Mancayan-Suyoc area was studied in 1904 by a field party from the Mining Bureau, consisting of Mr. A. J. Eveland, geologist in charge, Messrs. Maurice Goodman and H. M. Ickis, field assistants, and field employees engaged for the work.

BENGUET.—In Benguet some important development work has been done, particularly in the District of Antimok. Here lie the claims of Messrs. M. A. Clarke, Petersen, Clyde, Lehlbach, Reavis, and others, most of whom have been at work here for several yrs. The ore bodies are apparently very extensive and it is known that much of the ore is of a good grade, varying through the district from $5 to $50 per ton in gold, the most important pay streaks being worked averaging over $12 per ton. Many samples from tunnels and crosscuts, however, indicate such constant low-grade values also that mine sampling in Benguet, as elsewhere, should be conducted with great care, and in accordance with most modern practice, in estimating values of ore in the mass. This is particularly advisable in view of the fact that similar samples, similarly taken in the same workings, show variations from $1.65 to $43 per ton, as in one vein, in which the pay streak gives the latter values and the next 4' assayed only $1.65. This is an oxidized ore in a quartz gangue as far as uncovered. According to Mr. Lehlbach, who has persistently pushed development work, the vein systems of this district are closely related and are, above water level, largely of free milling ores. Messrs. Kelly, Clarke, Petersen, Reavis, and Clyde have done sufficient work upon their claims to prove deposits worthy of serious consideration and the amount of ore to be probably large. Mr. Clarke has received a 3-stamp quadruple-discharge Hendy mill and a 60-ton cyanide plant, all in charge of Mr. C. M. Eye, mining engineer. Messrs. Petersen and Clyde have built in Manila shops 3-stamp mill for development purposes, and reports indicate that they have had some satisfactory trial runs.

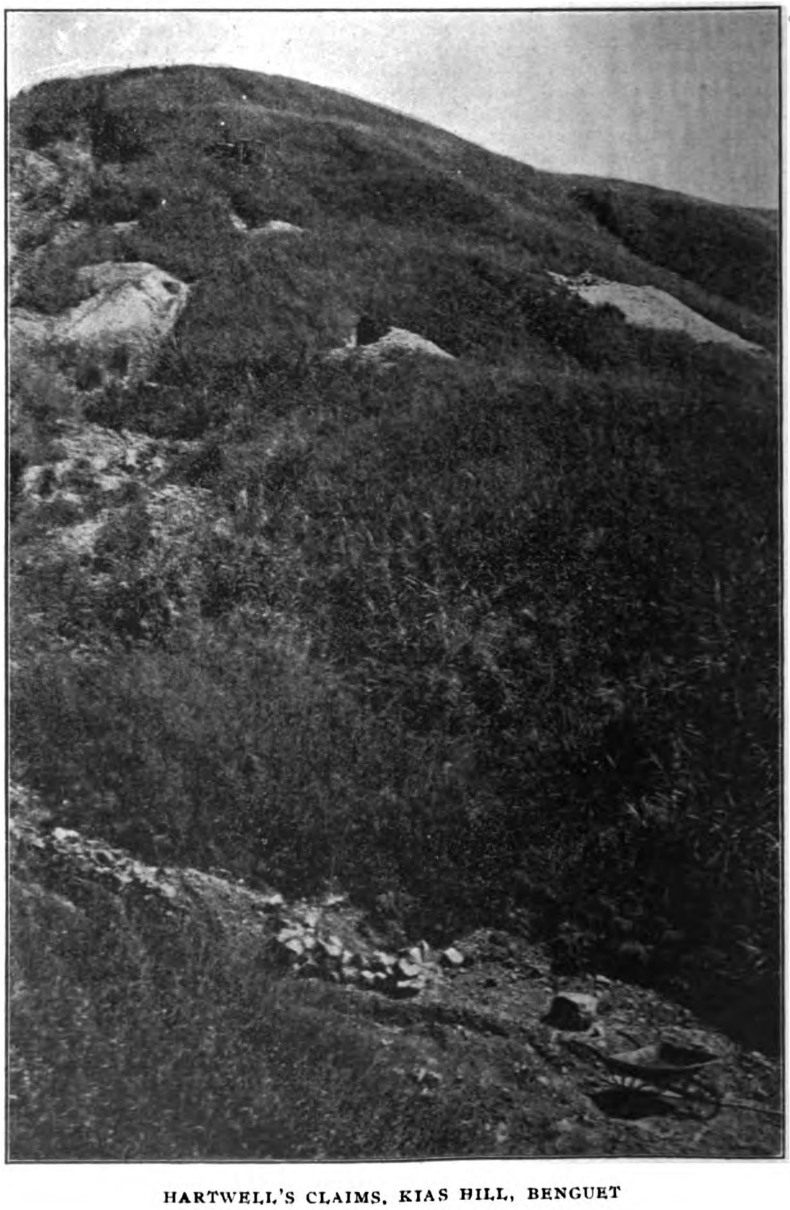
In the Bued River District Messrs. Hanson and Meade have uncovered a gold-copper lead upon which a 3-stamp mill will be erected at once. This mill is now being built in Manila shops and will be used for development and for trial runs. The ore is refractory and apparently a concentrating and shipping ore, and, as the "Copper King" claim, upon which it occurs, is near the Benguet Road and enjoys excellent transportation facilities, it is planned that trial shipments of concentrates to the Tacoma smelter be made. In this connection it may be stated that in response to requests made by this bureau for Philippine miners, the Tacoma smelter offers inviting terms to ore shippers here and has secured a rate per gross ton, f. o. b. Manila Bay, and delivered on smelter wharf at Tacoma, from the Boston Steamship Company, of $5 per ton.

In this district, also, Mr. Eveland reports that the ore outcrops on Mr. Petersen's "Gray Horse" claim are of lead, iron, copper, and zinc sulphides, carrying $20 to the ton in gold.

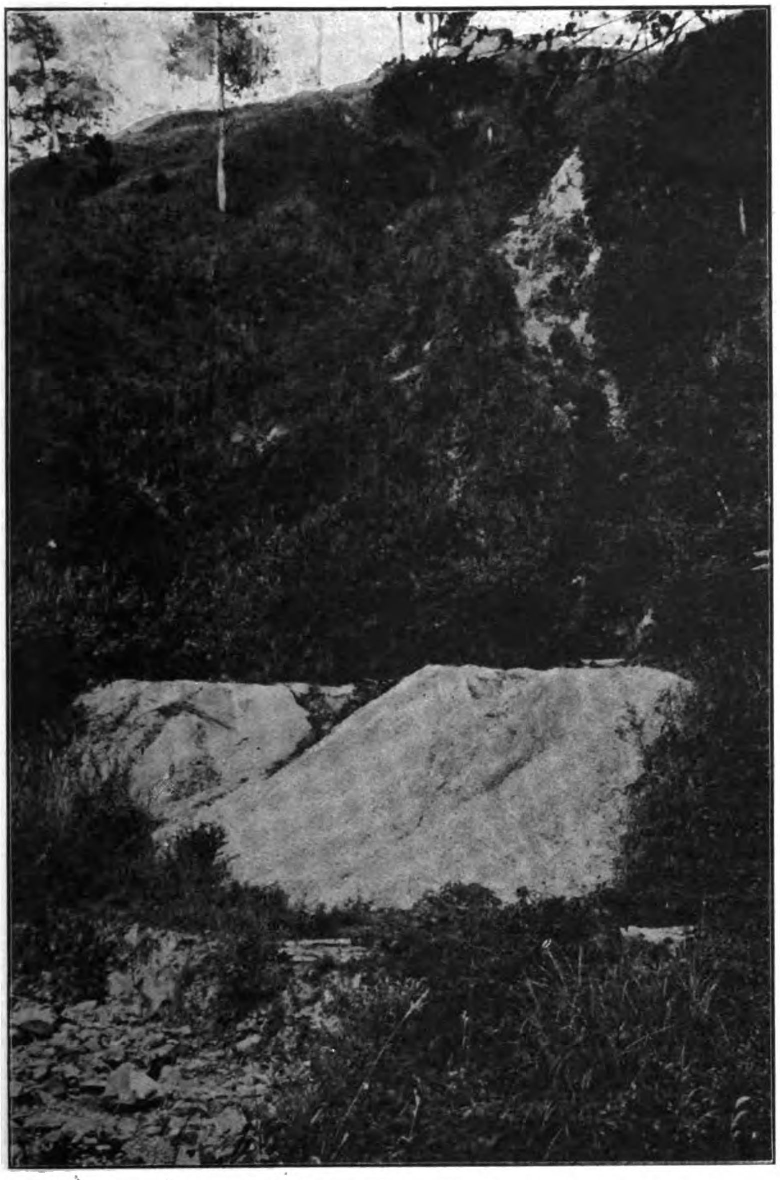
The 3-stamp mill that Mr. Hartwell built in Manila and operated at a profit on his "Hope" claim in Benguet has temporarily closed down, owing to the death during the yr. of the man who made it a success. Mr. Hartwell was a miner of the best type, conservative, competent, and combining within himself the sturdy qualities of the pioneer with the intrinsic



CLYDE'S CLAIM, ANTAMOK RIVER, BENGUET



HARTWELL'S CLAIMS, KIAS HILL, BENGUET



PETERSON AND CLYDE'S ORE DUMP, ANTAMOK RIVER, BENGUET.

NATIVE BLAST FURNACE, ANGAT IRON MINES, BULACAN, LUZON.

worth of high American citizenship. His loss is not only a loss to the mining industry here but to the large number of stanch friends he so readily made and kept. Mr. Hartwell was Kipling's "Explorer" personified, and whatever tribute may be found within those noble lines he richly deserves. He blazed the trail, explored the hills, found the gold, built the first American stamp mill in the Philippines, transported it to Benguet, worked his mine and mill and made them pay—all against constant obstacles that would mean failure to a man of less energy and grit. His reward was his successful struggle with difficulties that none but his kind can understand; his monument will be the gold-milling industry of Benguet.

PANGASINAN.—In Pangasinan in the foothills of the N. Zambales range, near Salasa, a number of claims have been recorded and worked. The ores here are copper carbonates and sulphides, assays of three samples from the claims of Mr. W. H. Miller, who is the pioneer in this field, showing respectively, 19.9, 11, and 18 per cent in copper, 13.2, 0.0, and 2 ozs. in silver, and $2.76, $1.60, and $3.80 in gold. These claims are favorably situated with respect to transportation by water and by rail, and if development proves these deposits extensive the prospects should seem good for profitable working.

NUEVA ECIJA.—In Nueva Ecija, near Gapan and Peñaranda, on the Rio Chico and elsewhere, extensive deposits of placer gold have been known for many yrs. No veins are yet reported, but prospecting in the placer ground is being actively prosecuted at the present time.

BULACAN.—In Bulacan, in the mountains E. of the towns of San Miguel and Angat, important deposits of rich hematite and magnetite iron ores have been known, and worked by natives in a small way, for over a century. Analyses of these ores have shown many of them to be very pure, and some of them fully up to Bessemer grade. Samples of them have been sent by the Mining Bureau to the steel works of Lewis & Hazlett, of Wheeling, W. Va., for analysis and report, and correspondence is now in progress with iron works of Japan looking to the profitable shipment of these ores. Analysis made by the government laboratories for the Mining Bureau gave the following results:

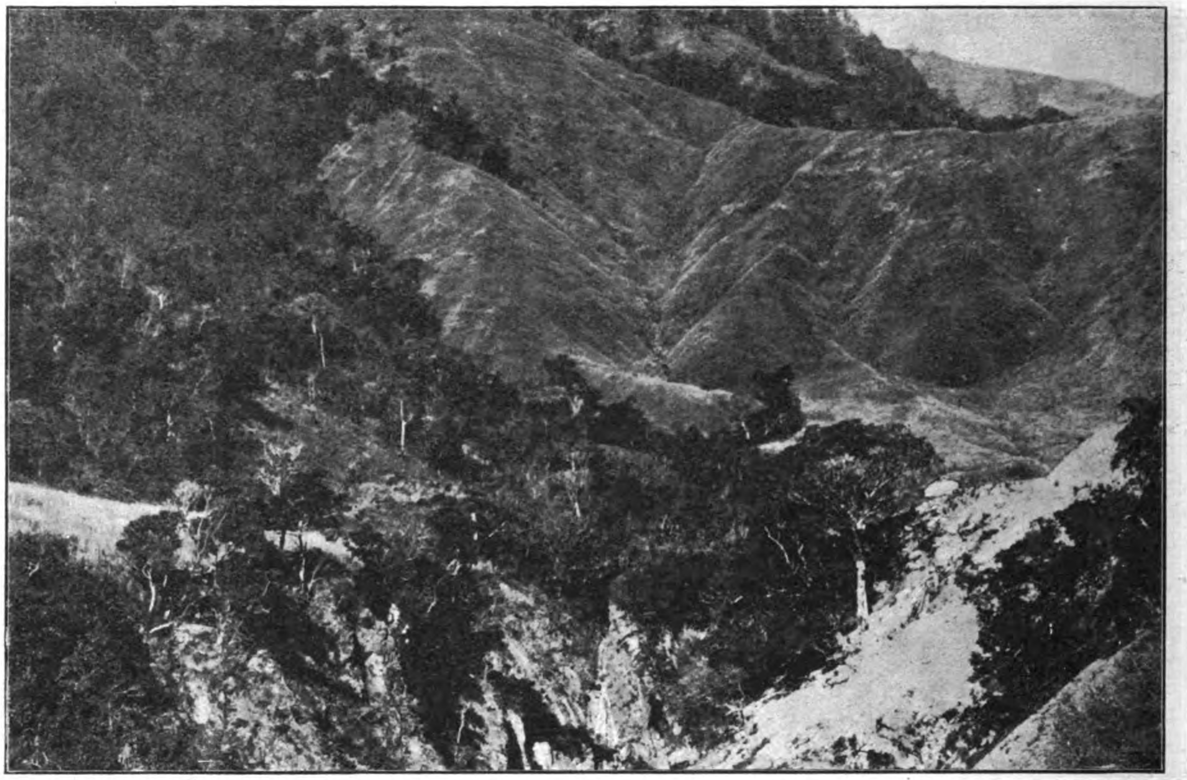
Bulacan iron ores.	No. 1, hematite.	No. 4, magnetite	No. 5 B, hematite.
	Per cent.	*Per cent.*	*Per cent.*
FeO	1.9	32 3	2.6
Fe2O3	88 2	48 7	84.2
CaO	.1	Trace.	.3
MgO	.2	1 3	.1
Al2O3	6.5	15.3	8.7
FeS2	....	Trace.	Trace.
CO2	....	Trace.	Trace.
H2O	.1	.1	.3
SiO2	2 2	2.2	3.8
P2O5	Trace.	.1	Trace.
TiO2	.8	.1	Trace.
Total	100	100.1	100

The natives of Bulacan have worked these iron ores in the open entirely and have smelted them in their small clay furnaces, with charcoal as fuel. No flux has ever been used, although vast quantities of limestone are at hand. Excellent gray iron castings have been made for plow points and shares, and the usefulness and economy of these deposits are apparently capable of far greater attention and profit than they receive at the present time.

RIZAL.—In Rizal Province placer washing for gold has been carried on by the natives for many yrs., and this has led American prospectors to the search for the origin of the gold in the hills. No important discoveries have as yet been made, however, other than the discovery of platinum, first identified in small amount by this bureau in placer sands from Rizal during the past yr. In Rizal Province, also in the vicinity of Bosoboso, there are coal and iron deposits which deserve more attention than they have yet had. At Binangonan occurs a limestone, fossilferous in part, which has recently been examined with reference to its use in the manufacture of Portland cement. An analysis of a sample of this limestone, collected by Mr. H. M. Ickis, field assistant, Mining Bureau, made by the government laboratories for this bureau, gave the following result:

Binangonan limestone.

	Per cent.
Water at 110°	0.16
Loss on ignition	43.15
SiO2	1.12
Al2O3	.08
Fe2O3	.07
FeO	.06
CaO	53.78
MgO	1.19
K2O	.28
Na2O	.49
Total	100.38
Specific gravity	3.29



BUED RIVER VALLEY AT CAMP IV, BENGUET.

This is at once seen to be an excellent material for the purpose of making cement; and there is available clay in the vicinity and good water transportation to Manila. Capitalists are now giving this proposition careful consideration with a view to erecting a modern rotary plant to cost not less than $225,000.

BATANGAS.—In Batangas Province work has been done in the Loboo Mountains upon 21 claims containing copper ores, two surface samples of which assayed, respectively, 2.71 and 17.1 per cent in copper, with a trace of gold in each, and a third showing 10 per cent in copper and $8 in gold. Later samples have given much lower results than those above.

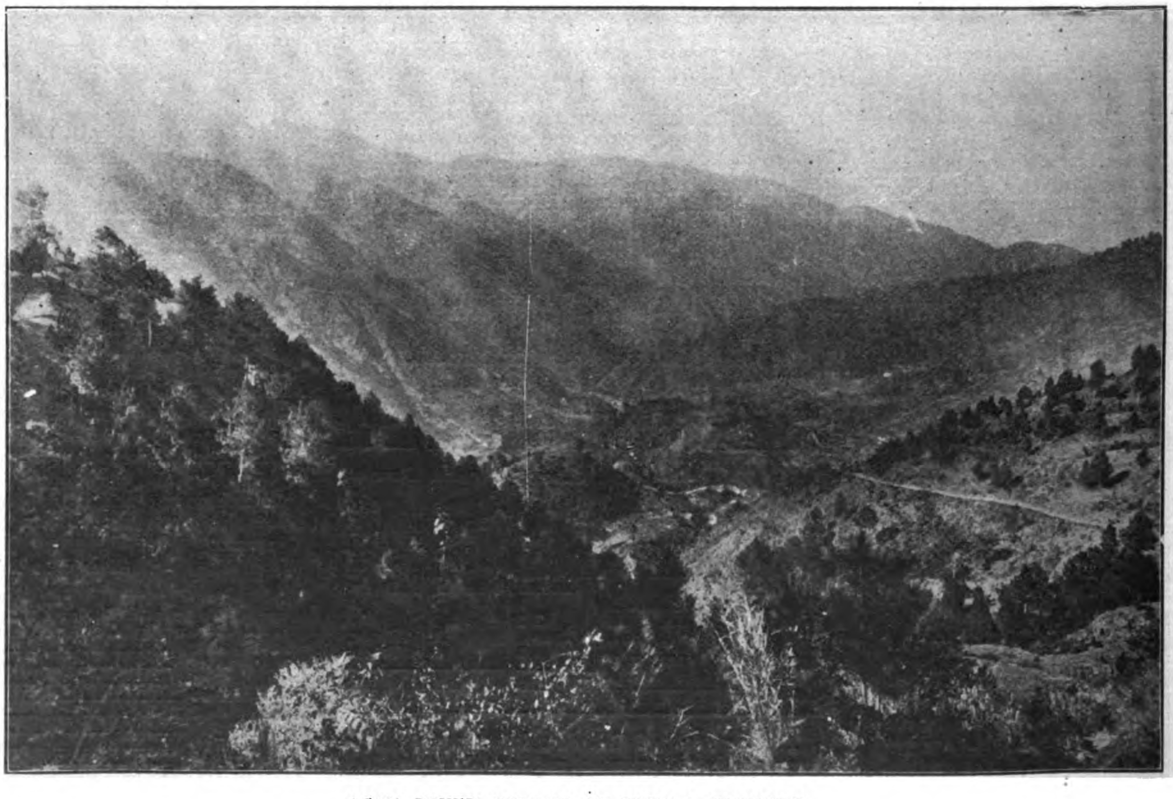
The veins are of two systems and of the fissure type, according to Mr. Smith, who has studied them, in dioritic rock (petrographically yet undetermined) and are from 6″ to 2′ wide, with an E.-W. strike for the major system and N. 45° to 57° W. for the second.

The principal minerals are bornite, chalcopyrite, tenorite, cuprite, chalcocite (?), malachite, and azurite. Traces of silver are carried by the copper, and one assay has shown the ore to carry $8 in gold to the ton. Molybdenite has been found scattered throughout some of the same veins in which copper occurs. The veins are principally of quartz, but porphyry and pegmatitic veins have been seen.

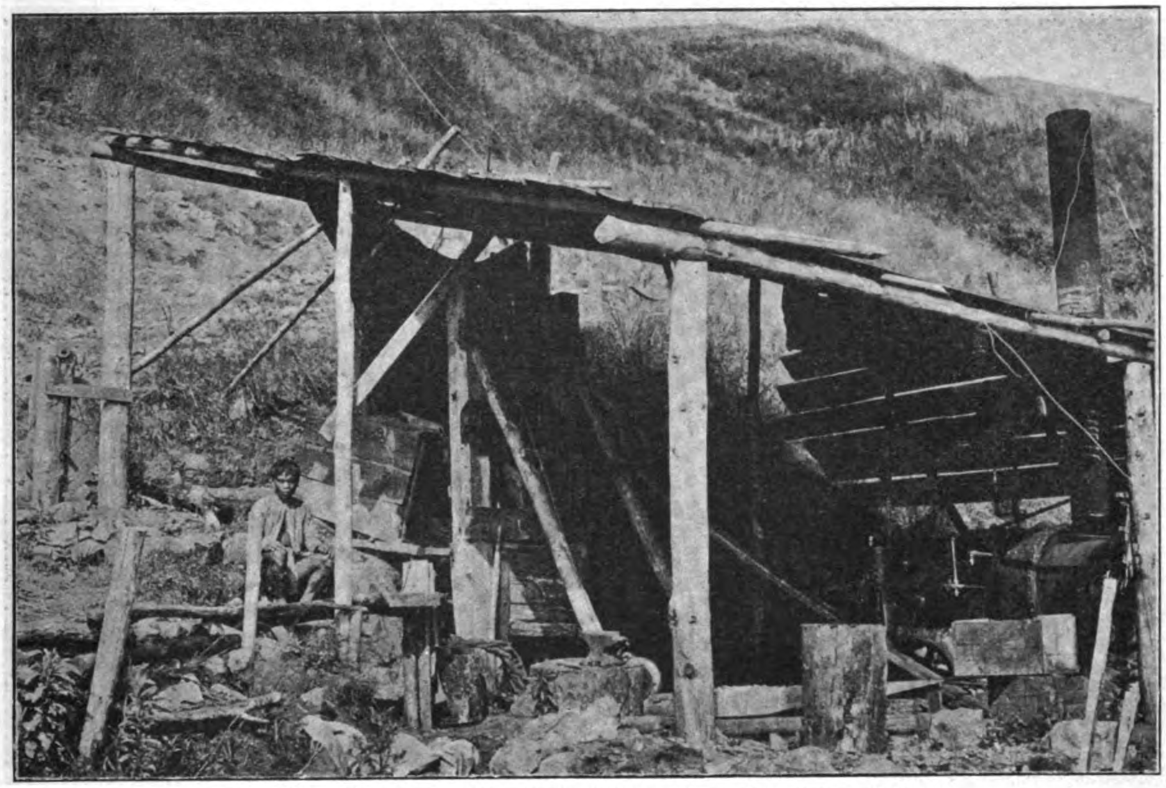
Up to the present time little more than assessment work has been done, but further development work will shortly be undertaken.

These properties are situated very advantageously for mining work, being about 600′ above sea level and not more than 5 ms. from a good harbor at Guinasepa on the E. coast of Batangas Province. Timber and water in abundance are available.

TAYABAS.—In Tayabas Province a large number of coal and petroleum claims have been recorded during the past yr., although it is not known that extensive development work has been done upon them. The Tayabas petroleum field lies on the E. side of the peninsula, on the Ragay Gulf. It has been reported that analyses of the petroleum have shown it to be of superior quality. No wells have yet been driven to thoroughly prospect this field, so far as known.



AGNO RIVER VALLEY AT BUGIAS, BENGUET.



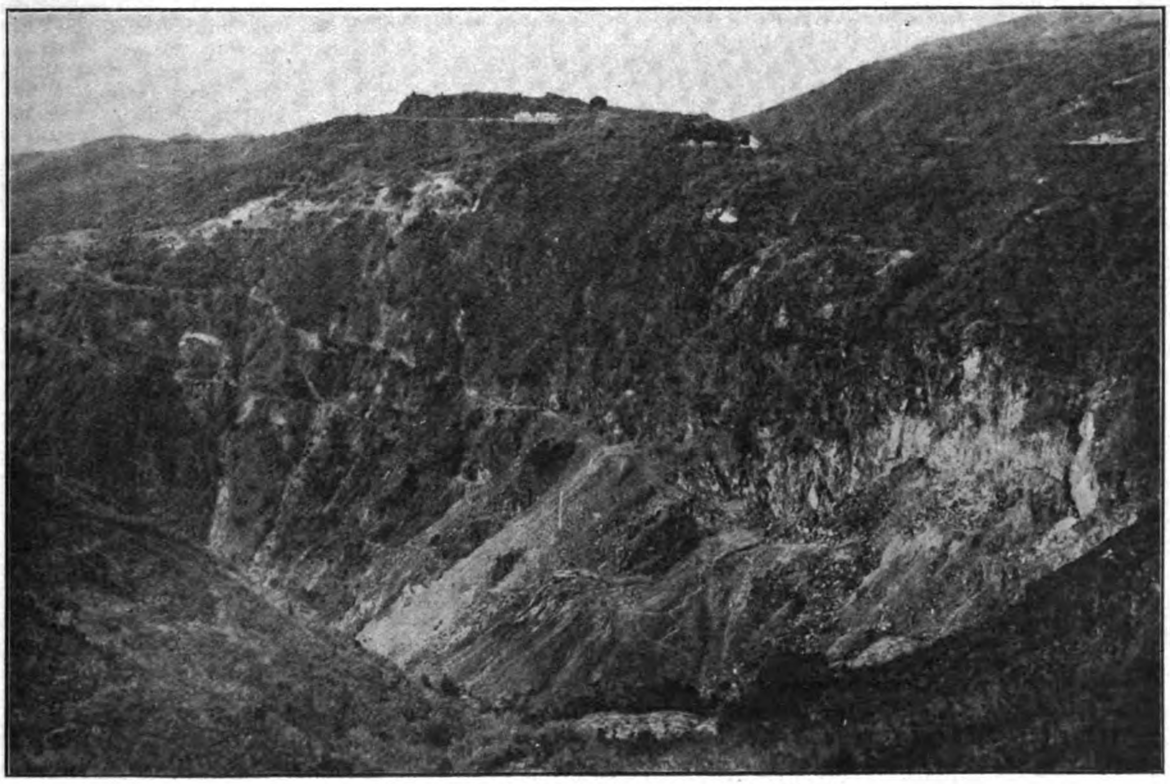
FIRST BENGUET GOLD MILL, HARTWELL'S MILL, KIAS HILL, BENGUET

POLILLO.—In the Island of Polillo, off the Pacific Coast, a large number of coal claims have recently been recorded. They cover a series of four seams, each apparently about 4′ thick, outcropping with an approximate N.-S. strike and a W. dip. The tonnage of available coal covered by the claims recorded is probably very great. No figures can be given, however, in advance of development work. There are no marked evidences of faulting or undue disturbance of strata, although folding undoubtedly occurs. Good harbor facilities are available and, upon the whole, these claims are considered worthy of serious consideration as affording a probable supply of workable steaming coal. Outcrop samples give the following analysis:

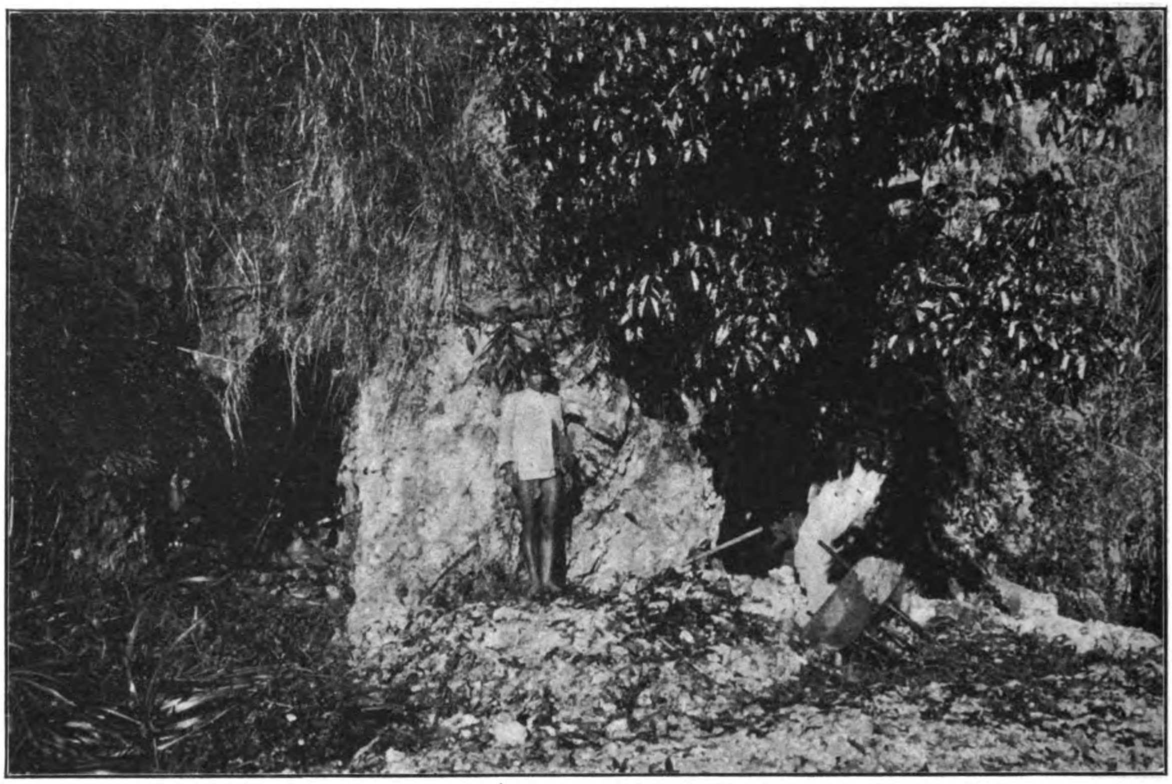
Polillo coal.

	Per cent.
Moisture	4.7
Volatile combustible matter	43.5
Fixed carbon	50.1
Ash	1.7
Sulphur	.28
Calorific value	6,897

AMBOS CAMARINES.—In the Camarines Province the Spanish concessions upon the extensive gold deposits in the districts of Paracale and Mambulao have been largely relocated by American mining men under present laws and without friction with the former concessionaires, and some work has been done in the reopening of abandoned shafts and in preparation for future systematic development. The important ore bodies of this district are reported to be contact deposits between crystalline schists and diorite, and to be well defined so far as uncovered. The contact is reported as traced for 20 ms., and along this all mining in this field has been done. Two vein systems intersect each other through the district approximately at right angles, the enrichment at some intersections having been reported upon as developing exceedingly high values. The strike of the most marked vein outcrops varies between 5° to 40° E. and the dip is reported to SE. The veins reported to be 1′ to 8′ wide and the vein filling to be quartz. Deep mining will probably involve pumping expenses of no mean consideration, but it is understood that much



COPPER DEPOSITS, MANCAYAN, LEPANTO, LUZON



OUTCROP OF KELLY'S NAPTUNG LODE, GOLD RIVER, BENGUET

valuable ore may be taken out before this expensive stage of mining is begun. It is fully believed that the deposits are worth the attention of competent mining engineers, retained by sufficient capital to work these mines; but, in the meantime, a preliminary step was taken this yr. in a careful study of this field by the detail of Mr. Eveland, geologist, to the work of a reconnoissance and the preparation of a general report upon the ore bodies themselves, and the further detail of Mr. Maurice Goodman, field assistant, to a careful survey of the placer fields of the Paracale and Malaquit Rivers. Reported assays from this district have averaged $20.92 in gold to the ton for the "San Mauricio," a representative group of claims covering deposits of partially refractory ore, and this for a large amount of systematic sampling reported by five different mining engineers. Assays of the "Tumbaga," a free-milling gold-quartz vein have given exceedingly rich returns, but as the sampling has been less carefully done upon this vein it would serve no good purpose to quote values here. The ores are described as sulphides of iron, copper, lead, and zinc, complex auriferous smelting ores in part and in part suitable for milling and cyanidation or chlorination. The placers have yielded important amounts of gold in the past, some of the nuggets being unusually large. While it may be somewhat doubtful whether sufficient rich placer ground remains for panning or sluicing methods, recent samples of gravel from the river beds indicate that dredger work here would pay. The average of 19 samples of gravel recently taken by Mr. Robert Lienau from the Malaquit River and examined by Mr. H. M. Ickis, field assistant, shows a value of 16 cts. to the cu. yd. It is anticipated that, notwithstanding mistakes that may have been made in the rather extensive development of the presumably rich ore deposits of this district in the past, the gold ores of Paracale and Mambulao, together with the placer fields, are most decidedly to be reckoned with in future work.

ALBAY.—In Albay Province, in Batan Island, Lieut. H. L. Wigmore, Corps of Engineers, United States Army, assisted by a detail of men, prosecuted an examination of the coal deposits for the military government by means of the diamond drill. Mr. W. D. Smith, geologist, Mining Bureau, was detailed to work out the economic geology of this area as his first work on the Philippines coal measures. The quality of the best Batan coals, which are classified by Mr. Smith as bituminous coals of Tertiary age, is shown by chemical analysis, calorific tests, and practical experimental use in boilers, to be excellent, and apparently fully suitable for steaming use. The quantity of the coal is believed also to be important, as are favorable local conditions for handling and shipping. Further and deeper borings should be made in Batan, however, before extensive mining is begun, to determine the continuity of the seams. Analyses by the government laboratories of some of these coals follow:

Batan coals.	No. 1.	No. 2.	No. 3.
	Per cent.	*Per cent.*	*Per cent.*
Moisture	6.62	9.54	6.08
Volatile combustible matter	38 68	41.56	40.36
Fixed carbon	54.42	44.86	51 24
Ash	1.28	4 05	2.32
Sulphur	.14	2.37	.40
Calorific value	....	6,983	6,487

MASBATE.—In Masbate, in the N. part of the island near the town of Aroroy, more or less work has been done upon 60 or more claims, principally of free-milling gold ores in quartz, and upon 20 or more gold placer claims on the Lanan and Guinabatan Rivers. Manganese and iron ores of high grade have also been found here, but little attention has been given them up to the present time. Upon claims of the Eastern Mining Company, Mr. A. Heise has just erected a 5-stamp mill, purchased from the Union Iron Works of San Francisco, to handle the free-milling ores, and as a result of successive trial runs 11½ days, during which an estimated supply of 100 tons was crushed, fine bullion to the value of $954.67 is reported to have been obtained. This would indicate the value of the ore to average a saving of $9.55 to the ton. Upon the quartz claims of the Cogran Mining Company, on the Lanan River, a considerable amount of development work, showing most favorable indications of large quantities of free-milling ore, has been done. A series of parallel veins in granite and serpentine, the relations of which are yet undetermined, are reported here with a secondary system of intersecting veins. Upon the "Queen of Sheba" claim of this district there is an estimated dump of 2,500 tons of free-milling ore valued at from $8 to $42 per ton, the result partly of recent extensive open-cut work, and the sinking of an inclined shaft on the footwall, and partly of ancient workings carried on in a primitive way. An arrastra, driven by carabao power, has been successfully at work here for several mos. past, and the erection of a modern stamp mill will probably follow during the present year. Upon four claims of the Aroroy district a 10-stamp mill, originally intended for Benguet, and now in the Islands, will be installed at once by the Philippine Gold Mining, Power, and Development Company, according to plans recently announced. Upon the placer ground of the Philippine Mining Company on the Lanan River, a Risdon dredge, which represents modern and thorough workmanship in every detail, has been installed. This dredge handles 1,000 cu. yds. of gravel *per diem*, the gravel running, according to the estimates of Mr. Fred L. H. Kimball, consulting and managing mining engineer in charge, 25 cts. and over to the yd. As the dredge should work for a total cost of less than 9 cts. per yd. a good profit would seem to be in sight. Upon the placer claims of the Masbate and Oriental Mining Company, on the Guinabatan River, a similar Risdon dredge has been installed. The Aroroy and Lanan mining districts of Masbate have been in most energetic and progressive hands but have attracted less attention thus far than they deserve.

CEBU.—In Cebu but little more than prospecting has been done during the American *régime*. There are important deposits of steaming coal in this island and two known deposits of lead ores. An analysis of coal from the promising coal measures of Carmen, containing four seams reported to be, respectively, 14′, 13′, 9′, and 17′ thick, will give an idea of the purity of the best Cebu coals:

Coal from Carmen, Cebu.

	Per cent.
Moisture	5.
Volatile combustible matter	43.92
Fixed carbon	48.51
Ash	2.2
Sulphur	.37
Total	100

These bituminous coals are better than many American lignites mined, sold at a profit, and used with success upon railway and steamship lines in the United States, and they have been proved by practical tests in steamships in Philippine waters to do very well indeed. Furthermore, they should be put on the Manila market for $3.25 per ton and on the market at Cebu

for \$2.50 per ton, as against Japanese coal at approximately \$5 and Australian coal at \$6 per ton.

MINDANAO.—In Mindanao some development work has been done by a little group of American miners at Placer, Surigao Province, but no late reports from this district are at hand. Some prospecting has also been done in Mindanao, and it is known that there is coal at Bislig and Sibuguey, and placer gold on the Agusan River and at Pigtao, near Misamis. This vast island is geologically yet unexplored.

ILOCOS NORTE.—Recent reliable reports are to the effect that asbestos has been found in quantity in Ilocos Norte; that metallic mercury has been found in Masbate, in the Camarines, in Zambales, and in Mindoro on the E. coast; that manganese deposits are cut by the Capas-O'Donnell rd.; that tin and tungsten have been found in NW. Negros, that infusorial earth occurs in Zambales and probably in Abra; and Mr. Smith has reported the discovery by him of molybdenite ores in veins in the Loboo Mountains of Batangas Province.

OTHER MINERAL DEPOSITS.—In addition to the above mineral deposits that have received some active attention or have just been reported or discovered, gold, platinum, copper, lead, zinc, manganese, iron, antimony, mercury, coal, sulphur, petroleum, salt, gypsum, limestone, clays, and building stones are known to occur in the Philippines as mentioned in the fifth annual report.

No more than investigation and development work have yet been done, and there are as yet no Philippine mines as the word "mine" is properly understood. In fact, there is little "ore in sight" in the sense that it is blocked out, but the indications are in many cases distinctly encouraging to more extensive work.

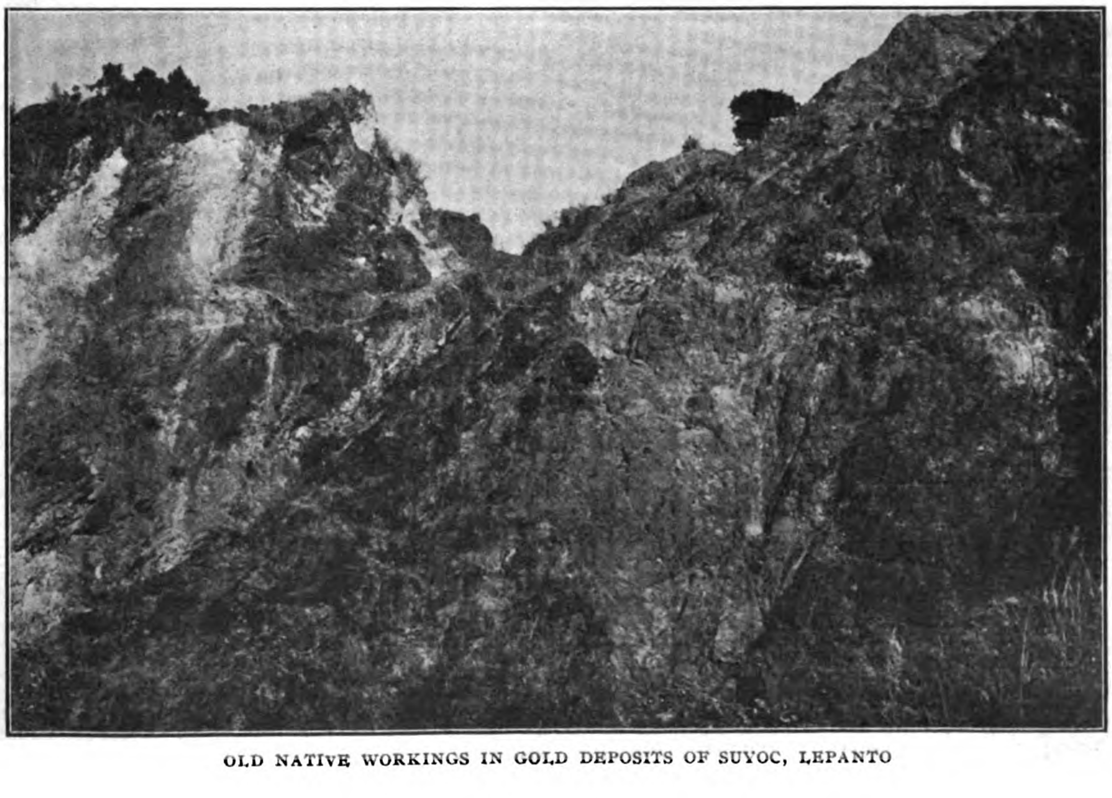
UNSATISFACTORY TRANSPORTATION. — Although the matter of transportation is not yet satisfactory and must necessarily remain a factor of great cost until the promised and prospective improvements of coastwise shipping and rates, of extensive railway construction, and, above all, of a greater mileage of good wagon roads of moderate grade, may have materialized, the labor problem has not yet interfered seriously with mining development nor is it expected to prove a factor of great uncertainty or cost. Mr. McCaskey's favorable views, expressed in the fifth annual report, concerning the possibility of developing sufficient and satisfactory mining labor in the Philippines, of Japanese and natives, or of natives alone, under competent white supervision, remain unchanged. He further believes this labor to be counted upon to afford mining at a comparatively low cost and therefore to render profitable comparatively low grade ores. Mining costs in the Philippines have so far been relatively low, and native labor has been almost exclusively employed. Mr. McCaskey is informed by Mr. Lehlbach, who has employed Japanese and native labor in Benguet, that he estimates that his total mining costs will be \$0.70, his crushing, sorting, and tramming \$0.24, and his milling and cyanidation \$0.89, per ton, United States currency, on a basis of treating 4,000 tons of ore per mo., and the above costs to be reduced to \$0.49, \$0.17, and \$0.59 per ton, respectively, on a basis of 15,000 tons per mo., this with native labor utilized under white foremen. These figures give totals of \$1.84 and \$1.25 per ton, respectively, but it is yet an open question whether costs so low can be maintained. Certainly they do not include pumping or hoisting from depth. In the Camarines Province it has been estimated that the total cost of mining, milling, concentrating, and management would be excessive at \$5 per ton. In Masbate Mr. Heise reports that the total cost of mining, milling, fuel, and management, with native labor, has averaged \$3.75½ per ton. The above are all gold-mining, stamp-milling, and development costs. In coal mining it has been estimated that at Carmen, in Cebu, the total cost of mining should not exceed \$1 per ton. In Batan Island, according to Mr. Smith, with Japanese labor, total mining costs have been \$2 to \$2.50 per ton. Lieutenant Wigmore estimates, however, that with Japanese and native labor mixed, and working on a commercial scale, total mining and loading costs should not exceed \$2 per ton. The above costs, it must be remembered, are during the pioneer stage of development and adjustment to new conditions; it is expected that they will be reduced in time, with the exception of Mr. Lehlbach's estimates. At least two mining men doing development work have stated that their preference is for native labor over Japanese, and the tendency is for the native to step into his proper place in Philippine mining and furnish the bulk of the labor required. It is not contended for a moment that native labor in general has been entirely satisfactory in the Philippines during the past few yrs., but it is contended very strongly that for this unfortunate condition of things, particularly with reference to agricultural labor, the laborer has been by no means entirely to blame; and with special reference to a relatively new field, such as mining, it is believed that with the absolute essentials of *(1)* fair treatment, including reasonable wages and prompt payment, and *(2)* competent supervision, a sufficient and satisfactory quality of native labor may be depended upon.

On the whole, therefore, the mineral industry of the Philippines has steadily grown. What its future may hold can not be safely prophesied now; but with the Islands at peace and under a safe and stable government, with no more of a labor problem than it is believed can be overcome, with increased transportation facilities in sight, with more confidence on the part of capital, and a better showing on the part of prospecting and development work, a conservative estimate would indicate a bright outlook for the year 1906. It is hoped and believed that the sturdy pioneers who have blazed the trail through many a heart-breaking day in fever swamp, jungle, and forest, during years of peril and privation, the full tale of which will never be told, will yet come into their own, and through them that the mineral industry of the Philippines will prove an important factor in the development of prosperity and progress under American rule.

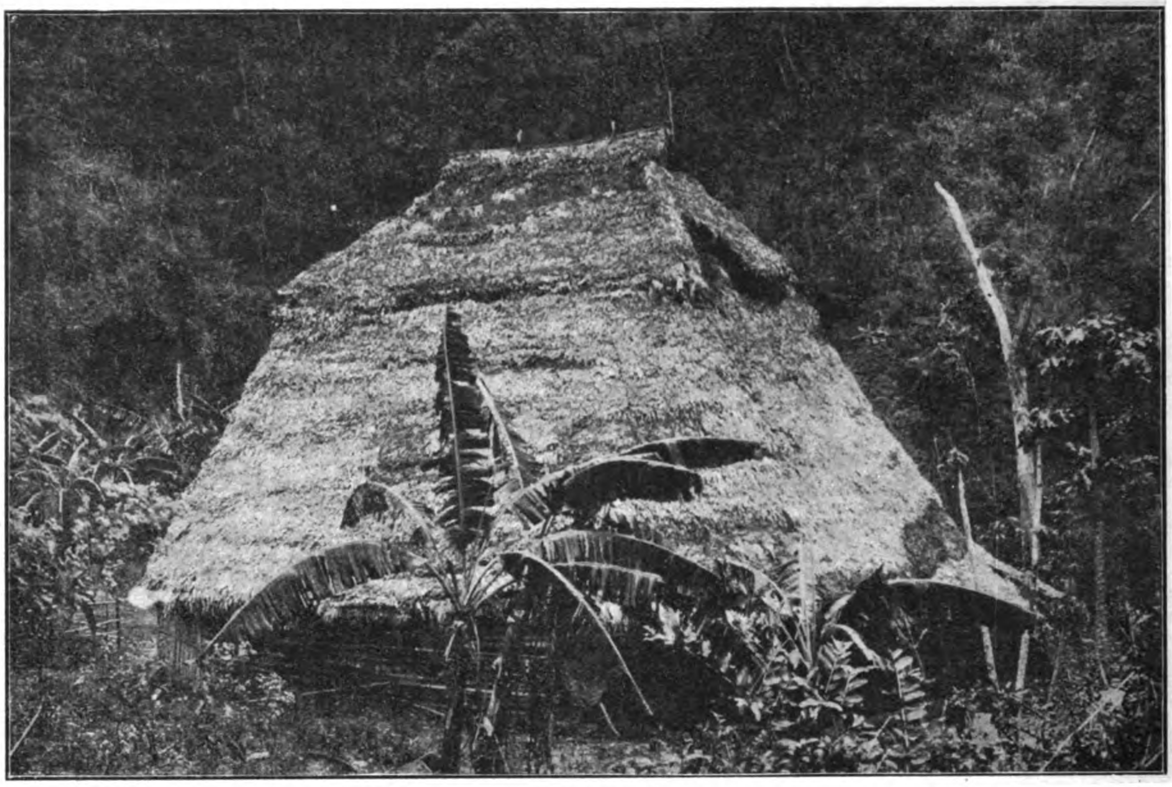
FINANCES OF THE BUREAU, FUTURE NEEDS.—For the expenses of the fiscal yr. just past the appropriations were ₱25,000 for salaries and wages and ₱6,100 for field and office expenses, a total of ₱31,100. Of this amount there were expended for salaries and wages ₱23,992,95, leaving a balance of ₱1,007.05, and for contingent expenses ₱5,988.30, leaving a balance of ₱111.70; the total balance to the credit of the Bureau for the year from unexpended funds is therefore ₱1,110.75.

For the present fiscal yr. the estimated amount required for salaries and wages is ₱28,261.04 and for field and office expenses ₱13,207, a total of ₱41,468.04.

The increase in salaries and wages estimated, of ₱3,261.04, is made up of difference in salary of one geologist at ₱4,000 between the entire yr. 1906 and a portion of the yr. 1905, and increases in salary recommended of one field assistant from ₱2,400 to ₱3.600, and of one chief clerk from ₱2,800 to ₱3,200, for part of the yr. 1906, upon completion of 2 yrs. of highly satisfactory service. The increase in contingent expenses estimated, of ₱7,107.00, is more than covered by estimated printing ex-



OLD NATIVE WORKINGS IN GOLD DEPOSITS OF SUYOC, LEPANTO



NATIVE SMELTER CAMARIN, ANGAT IRON MINES, BULACAN, LUZON

penses for four publications of this bureau and for forms, blank books, letter heads, etc., not estimated or provided for in 1905, amounting to ₱7,000; of postage and telegraphic expenses, in lieu of the free service of the past and therefore not estimated or provided for in 1905, amounting to ₱2,540, and of an increase of ₱400 in field expenses for the more extensive work of this yr.; in all, amounting to an apparent increase in contingent expenses of ₱9,940, of which ₱9,540 is an estimate due to required estimates for expenses not charged against this Bureau last yr. thus showing a relative *decrease* in contingent appropriations of ₱2,833 for the fiscal yr. 1906, or a relative total increase of all appropriations over last yr. of but ₱828.04 for the present fiscal yr.

The just promotion of two especially loyal and efficient members of the bureau staff, the necessity for the increased field work possible with the completely reorganized bureau, and the demand for reliable published information upon the mineral resources of these Islands, it is believed, will fully justify the necessary increase of appropriations required.

GREEN ISLAND CEMENT COMPANY, LTD., HONGKONG

The 17th ordinary general meeting of the shareholders of this company was held Saturday, February 24th, at the office of Messrs. Shewan, Tomes & Co., general managers, in Hongkong. The Hon. Mr. Shewan presided. The chairman said:—

GENTLEMEN:—The report and accounts for 1905 were issued on the 9th inst., and we will therefore, with your permission, take them as read now. As we anticipated at last yr.'s meeting we have done still better than before, and the accounts show a gross profit on working of $498,834 as against $444,094 last yr., the net amount available for appropriation, after deducting interest and sundry charges and allowing for depreciation, being $437,219.87. Out of this we propose to place $10,000 to reserve fund, and pay a dividend of $2 per share and a bonus dividend of 50 cts., absorbing $375,000 leaving $52,219.87 to be carried forward to the credit of next yr.'s account. As it was represented to us by influential shareholders that a larger dividend than that of last yr., *viz.* $2, was expected, and as we are anxious to meet the views of shareholders though at the same time we are averse to increasing the usual rate of dividend until we feel more confident of maintaining it at the increased figure, we recommend an extra bonus dividend of 50 cts. per share on this occasion, which we hope will be approved by all shareholders. As good provision has been made for depreciation, and as the reserve fund is invested in the business of the company itself, and is not a reserve in the true sense of the word, we recommend placing only $10,000 to the credit of that fund, which will then amount to $910,000.

Throughout the yr. the demand for our cement was very good, and we had no difficulty in disposing of all we turned out. The full benefit of our new rotary kilns was not however received, as after their installation much time was necessarily consumed in training our workmen, and accustoming them to the new condition of things. I am pleased to say that these kilns now promise to exceed our highest anticipations.

So much for the profit and loss account. Referring to the balance sheet you will have no doubt noticed the large stocks principally of raw material that we are carrying. I can only assure you that this is absolutely necessary. Your general managers lay great stress on the advisability of keeping these stocks, and would make them even larger if possible, as with our continually increasing output, even now, they are by no means large in proportion to the consumption. They are all valued at actual cost, and no credit has been taken for any profit on manufactured cement. As you will see from the figures a great deal of money is tied up in these stocks, and so, in spite of the last increase of capital, we still owe $250,000 to our bankers. The other items in the balance-sheet are comparatively trifling, and I do not think require any explanation.

I now come to another point which has been raised. We have been urged by some of our largest shareholders to pay an interim dividend half-yearly, but it seems to us that it would be hardly right to do this so long as we have to go to our bankers for the money. The payment of this dividend will increase the present overdraft considerably, so if we are to wait for interim dividends until we have funds in hand we may have to wait some time. The only way we can meet the wishes of these shareholders is to raise more capital, and it is proposed that we should issue a further 50,000 shares at par, which will bring in $500,000 and raise the capital to $2,000,000. We cannot expect to always run on borrowed money, and $2,000,000 is not a large capital for the business we are doing. On the contrary, you must not run away with the idea that such works as ours could be built with a capital of even $2,000,000, for to that you must add $800,000 of original capital written off and the $900,000 at reserve, which is really capital. So that to duplicate factories such as ours to-day would take at least $4,000,000, if not more, and yrs. of experience into the bargain to run the business. Of course, this proposed increase of capital must be dealt with at a special meeting, of which due notice will be given, and it will be then for shareholders to decide whether they are in favor of it or not. We might have followed the previous course, and issued the shares at a premium, but shareholders appeared to be opposed to this, and as the 5 *lacs* seems to be about all we shall need we recommend leaving the shares at par. The new shares will, of course, rank equally with the old shares for dividend, and to save time and trouble to all concerned it is proposed to make one call only of $10, due on 31st July next.

As regards the future it is impossible to make a forecast; the brightest feature in our favor is that the use of Portland cement (for you must not forget that ours is true Portland cement) has increased, and is increasing all over the world. Coal, too, which has been very high during the yr., has fallen somewhat in price; but, on the other hand, the present high rate of exchange is against us, and then, too, our two best and largest local contracts are rapidly running out. However, railways in China have brought us some business, and will, we hope, bring us a good deal more. There is nothing more that occurs to me as useful to add except that I should like to put on record your general managers' appreciation of the loyal and hearty support they have received from the manager, Mr. Uldall, his deputy Mr. Hewitt, and all the staff at both factories in a very busy year.

Mr. Michael, referring to the increase of capital, asked if, instead of issuing new shares at $10 and paying 20 per cent dividend on them, it would not be better to borrow money at 6 per cent and give the shareholders the benefit of the difference.

The Chairman: It would be better if you could depend on getting money at 6 per cent.

Mr. Michael: Every company in Hongkong is getting it at that.

No other questions being asked the Chairman proposed the adoption of the report and accounts.

Sir Paul Chater seconded.

Carried.

Mr. Parlane moved the re-election of Sir Paul Chater, Hon. Mr. C. W. Dickson and Dr. J. W. Noble to the consulting committee.

Mr. Carmichael seconded.

Carried.

Captain Clarke proposed, and Mr. Moses seconded, the re-election of Messrs. T. Arnold and W. H. Potts as auditors.

Carried.

The Chairman: That is all the business, gentlemen. Thank you for your attendance. Dividend warrants are ready now.

NEW AMOY DOCK COMPANY, LTD.

This company's working account for 1905 shows a profit of $22,506.62. Deducting the debit balance from 1904 amounting to $10,260.77 the total profit was $12,245 85. To this is added the premium on an issue of 4,000 new shares amounting to $10,000, making a full total of $22,245 85, which amount it was proposed at the recent annual meeting of the company to deal with as follows:—Transfer to reserve fund, $32,500; write off plant and machinery $3,910.19; write off material, $1,589 81; commission and fees to manager, $1,224.58; general manager and consulting committee, $800; dividend of $1 per share on old issue, $6,000; dividend of 50 cts. per share on new issue, $2,000; carry forward, $2,221.27. The reserve fund now stands at the substantial figure of $88,000. The new issue was all taken up and all shares will from now on rank same for dividend. During the 1st half of the yr. work was scarce, but the latter half the dock was well employed and there is every reason to look for good and profitable work in the future. Mr. R H. Bruce resigned as general manager on leaving port, and Mr. F. B. Marshall was invited to fill the post. The retiring directors, Messrs A. F. Gardner and W. Kruse have been reelected.

ARGUMENT BY MR. REA AT WASHINGTON (D. C.) FOR TARIFF REDUCTION ON PHILIPPINE SUGAR

[Before the Ways and Means Committee of the lower house of Congress, having under consideration the "Payne" Bill.]

The CHAIRMAN. Gentlemen, we will now hear Mr. Rea.

Mr. Rea, please give your name to the stenographer.

Mr. REA. My name is George Bronson Rea.

The CHAIRMAN. How long have you resided in the Philippines?

Mr. REA. Two yrs.

The CHAIRMAN. And before that where did you reside?

Mr. REA. Thirteen yrs. in Cuba as a sugar engineer and manager of an estate.

The CHAIRMAN. Were you engaged in the sugar business in Cuba?

Mr. REA. Yes.

The CHAIRMAN. In what capacity?

Mr. REA. In all capacities, from engineer up to manager of the estate. I was also representative of one of the largest sugar machinery houses in New York.

The CHAIRMAN. Go on and make your statement.

Mr. DALZELL. Before you go ahead, let me ask what business are you in at Manila?

Mr. REA. At present I am engaged in publishing an industrial and trade paper, called THE FAR EASTERN REVIEW. It has a wide circulation all through the Orient. I am making a study of trade questions there. I went over there to go into the sugar business primarily, but conditions were not favorable, and instead I went into the newspaper business.

The CHAIRMAN. Go ahead.

Mr. REA. I want to be very brief in presenting this statement, and dwell upon one or two points which the opposition has pointed out strongly against us—the possible low cost of production in the Islands and the effect it might have on home industries later on.

In placing before your consideration my reasons and arguments why the Philippines should be conceded the benefits of a reduction in the tariff as embodied in the Payne Bill, I want first to take up and analyze the statements and opinions so glibly presented in opposition by our friends Major [Aaron] Gove* and Mr. (F. R.) Hathaway.†

The trend of their argument, if their private opinion may be dignified with that expression, is to the effect that the conditions in the Philippines as to labor, soil, production, and yield are such that, if permitted to develop, they will ultimately swamp not only the American beet-sugar industry, but also the cane-sugar industry of Louisiana, Hawaii, and Porto Rico, and seriously handicap the industry in foreign countries.

These gentlemen have appeared before this committee, after a brief trip through the Islands, and posed as authorities on a subject which has been the bane of congressional legislation for several yrs.

In a matter which so seriously affects the industrial development of the Islands and the future of our insular possessions, it is only fair to presume that persons appearing before this committee should be qualified by experience to vent their views and opinions, especially where absolute data are lacking and where we have to rely on personal deductions.

Major Gove, one of the so-called experts who has regaled the committee with his views on the Philippines, was sent out to the Islands to find out the truth about the situation. Now, it appears that Mr. Gove is a school teacher, a professor, or in some way connected with the educational department of his state, and has a fair knowledge of raising beets; yet without any previous training or knowledge of the cane sugar industry he departs for the other side of the world to find out the truth about something he does not understand—something which has puzzled experts for the last 10 yrs.

* Representing the beet-sugar interests of Colorado, against tariff reduction.

† Representing the beet-sugar interests of Michigan, against tariff reduction.

Mr. Gove, in his lack of knowledge concerning tropical agricultural conditions—you will remember that he wouldn't recognize a tobacco plant if he saw one—was distinctly handicapped when he set out on his journey, and doubly handicapped after his arrival by his ignorance of the language, which forced him to rely entirely on the garbled statements of native interpreters, who probably didn't know what he was talking about, anyhow. Yet the gentleman traveled around the Islands, gathering ideas, information, etc., on which to base a conclusion. He was forced, through his ignorance of the industry, to accept whatever was told him, and this same inexperience prevented him from delving into and analyzing the things which he heard.

Yet Mr. Gove formed an opinion, and he comes before this committee to unbosom himself of the great discovery that the Philippines can produce sugar cheaper than any other place in the world, and if this bill passes they will produce it cheaper yet and swamp our home market.

Mr. Gove could not for the life of him get up here and explain by actual figures how this can be done, yet he takes up the time of the committee by telling it in so many words that he thinks it can be done. Not one single detail of cost has he put forward on which to base his deduction so that he can prove his assertions, yet he comes here as an authority and endeavors to sway this committee against the proposed bill.

We find in his companion, Mr. Hathaway, a gentleman of the same type. Mr. Hathaway, however, tells us that he went there in the guise of a promoter, to obtain options on lands, etc., and gather data for others who intended to start a sugar factory if his reports were favorable.

Now, do not mistake me in that I doubt the veracity of Mr. Hathaway's statement in regard to this, but it is fair to say that it is highly improbable that his mission was a serious one, for again we find that Mr. Hathaway is a beet-sugar man with no previous knowledge of tropical cane-sugar conditions, and whose opinion or report before a body of capitalists would be considered worthless. It is logical to presume that when capitalists seriously contemplate investing anything like a half to a million dollars in an industrial enterprise, especially on the other side of the world where they have to rely on expert reports, they will pick out a man who thoroughly understands that particular line of business. When the sugar people on lower Wall st. want information about cane lands and the prospects of making an enterprise pay they don't select and send out a beet-sugar man, but look for the best cane-sugar expert available. Neither do they give a cane-sugar man a commission to investigate lands and conditions in the beet districts. They get a beet expert to handle this matter.

Now, Mr. Hathaway also operated under the same handicaps as Mr. Gove, but with the further disadvantage that he represented himself as wanting to invest in sugar lands and erect a large factory. Now, you can imagine the kind of information he obtained from a bunch of planters, loaded down with debt and worked-out lands, all anxious to get in on the band wagon. [Laughter.] You can bet that human nature in the Philippines is exactly the same as it is here, only a little more so in that one particular; and lands that would grow 1 ton of sugar suddenly increased in fertility, without the application of irrigation and fertilization, to 3 and 4 tons, and prices of lands rose in proportion. Mr. Hathaway just reveled in the kind of data he was looking for, and swallowed it all. As some at the planters told me afterwards, he looked such an easy mark that we *tomo el pelo*, or, in the English, "We took his scalp."

Now, if Mr. Hathaway knew anything about the cane-sugar business he could by simple observations have sized up conditions and seen when the statements were exaggerated. If he ever had any extended experience on a cane-sugar plantation he could, by riding round a cane field, arrive at a fair estimate of the tonnage; and similar knowledge of the mechanical equiment of the sugar house would enable him to know just how much sugar could be extracted. But Mr. Hathaway in his apparent ignorance of the most rudimentary facts about cane-sugar accepted the statements rendered him, and was unable to analyze or digest them after he absorbed them.

Yet Mr. Hathaway also comes before the committee and says in effect the same as Major Gove. This may be called expert testimony, but, gentlemen, it would never be accepted by a body of business men as a basis for an investment. On its face it is absolutely worthless, and, taken together, the entire statements are the finest exhibition and collection of hot air that I have ever seen published.

We are not going into details in what I say, gentlemen, but we will take the general outlines. We are all tired of statistics.

They state, in effect, that sugar can be produced from 1c. per lb. down—the cheapest production the world has ever seen. Now, when we make a definite statement of cost, that cost is open to analysis, for it is made up of many items. To make such a statement one ought to be able to prove it by figures. There are many minor details which go toward making that cent or less, such as plowing, harrowing, drilling, planting, cultivating, cutting, seeding, hauling, milling, boiling, and other items; and when the assertion is made that sugar can be produced at a cost of a cent downward it requires elaboration.

Now, I may state for the benefit of the committee that I spent over a mo. in Pampanga and Negros devoting my time to ascertaining the cost of a picul of sugar, by following each stage of the work from the time the plow was put in the ground to the time the sugar was handed to the local market, and my investigations bear out the statements, presented by Mr. De la Rama and others, that the average cost price, without including interest, loss of cattle, depreciation, etc., is about $4 per picul, or, roughly, 1½ cts. per lb., or, including everything, about 2¼ cts.

The CHAIRMAN. Is that without any depreciation?

Mr. REA. Yes; without including that.

The CHAIRMAN. Sugar delivered where?

Mr. REA. In Manila, from Pampanga. It is the bare mill and field cost, delivered either at Manila or Iloilo. It is about the same thing from either place.

Now, when persons who admittedly know little or nothing about the conditions in the Islands, except by hearsay, coupled to their inexperience with the industry, endeavor to inflict their private views before a committee of this standing, and in contradiction to the statements of those who should know what they are talking about, it is surely permissible to request that they submit an itemized statement of cost, bearing out their views, so that we can see whether they are right or not.

Now, I am intensely interested in this subject myself, and am desirous of finding out just how this low cost is arrived at. It must be remembered that the movements of all farm laborers, especially those employed in plowing, cultivating hauling, etc., are regulated entirely by the sweet will of the frisky and swift-moving carabao. The carabao sets the pace, and when we stop to think about the time necessary to plow a field we can not calculate on harnessing up several horses and mules to a big disk plow, but have to take as our basis the pace of the carabao and his one little 6-in. plow; and if we add two or more carabao with the hope of making them go faster, they refuse to work together. [Laughter.]

Some of the gentlemen comprising the committee have seen the carabao on his native

heath and admired the celerity of his movements. [Laughter.] People wonder why the Filipino is slow in movement, especially the countryman. If I may venture an opinion, I think that the natural development of centuries of following the carabao has something to do with the movements of the natives.

I think that for the full information of this committee our friends should be called upon to produce their figures on which they base this low cost of production. If it is permissible, I would like to have these figures now, as the gentlemen are present and must have them about their persons somewhere. If the honorable chairman will call for these figures, I will conclusively prove to the satisfaction of this committee that neither of the gentlemen referred to knows what he is talking about; or if they will take the standard wage of 20 cts. per day and a yield of 1 ton to the acre and bring that cost down to less than a cent, I stand ready to hand them over $100 for the information. If it is permissible before the committee, I would like to have the facts known. But they can not produce them, anyway. Neither Mr. Hathaway nor Mr. Gove can stand up and give you an itemized answer as to the cost of a picul of sugar. I would like to have that information now. I will give them $100 for it. It is worth that to me for an article. I can use that for my paper, and would be glad to pay it, so as to show the Philippine planters just how they can do it.

Mr. HATHAWAY. You will get it.

Mr. REA. And you will get the money, too.

Mr. HATHAWAY. I need it.

Mr. REA. But it must be made up of real figures, based on an actual calculation.

Now, gentlemen, it has been repeatedly asserted, though no definite figures have been placed in evidence that if this bill is passed capital will be forthcoming, and under modern methods of cultivation and manufacturing the industry in the Islands, like the pipe dreams of Colonel Sellers, will develop to such an extent and so rapidly that in about 2 yrs. we will produce 10,000,000 tons of sugar. The production of the lands will quadruple, the rattoon crops will live forever, and the yield from the mill will be so great and the cost of production so low that the profits will be enormous. The bill, like Aladdin's lamp, will be sufficient for everything.

Now, in all the comparisons of the tropical cane-sugar industry made by the opposition great care has been maintained to take the most favorable phase of the industry in Cuba and Hawaii to show what can be accomplished in the Philippines. The following is a sample of this nature. It is a short quotation from my paper, THE FAR EASTERN REVIEW, which I have cut out [reading]:

PHILIPPINE SUGAR INDUSTRY.—In the senate debate on the Cooper bill of December 16, Senator Dubois, of Idaho, a champion of the beet-sugar trust, made the following biased remarks:

"There are in the Philippine Islands some 72,000,000 acres of land, only 5,000,000 acres of which are in the possession of individuals or corporations. The other 67,000,000 acres are public lands, and, as a general thing, they are exceedingly rich for agricultural purposes. Some 50,000,000 acres of land in the Philippine Islands are susceptible to the highest cultivation, and this is especially so in regard to sugar. In Louisiana, in Texas, and in other favored spots of this country they have raised from 1 ton to 1½ tons of cane sugar to the acre; in certain other favored portions of our country they raise from 1 ton to 1½ tons of beet sugar to the acre; in Cuba they raise about 4 tons to the acre; in Porto Rico, about 4½ tons; in the Hawaiian Islands, 4 to 4½ tons, and on some plantations in Hawaii they raise as high as 10 or 11 tons to the acre, and the Philippine Islands are more productive for sugar than the Hawaiian Islands."

Mr. DALZELL. When were those remarks made?

Mr. REA. They were made on the 16th of December last yr.

Mr. DALZELL. In 1904?

Mr. REA. Yes. This was taken from the Congressional Record. (Continuing:)

This is an excellent example of the tactics of the opposition, showing, as it does, the unwarrantable exaggeration of everything connected with the tropical cane-sugar industry and conveying a false idea of the possibilities of the Philippine yield. Broad, unqualified statements of this nature operate against us and are taken for gospel truth by the uninitiated.

The main points in the statement are fairly correct, although the figures are stretched to the fullest yield under the most favorable conditions and can not be accepted as normal or average. It is, however, the unfair comparison of the closing words of the paragraph to which objection must be taken. All tropical sugar lands under natural conditions—that is, without the aid of scientific fertilizing, cultivation, or irrigation—will produce an average of 2 tons of sugar to the acre, or rather 20 tons of cane. The best virgin lands will run about 4 to 4½ tons for the first 2 yrs., and then dwindle down to 1½ to 2 tons. It is true that on some estates in Hawaii 10 to 12 tons of sugar are produced from an acre of cane, but to state immediately afterwards, without any qualifying remark, that the Philippine Islands are more productive than Hawaii demonstrates a dense ignorance of the subject-matter or a willful attempt to distort the facts in favor of the beet-sugar industry.

The Hawaiian plantations producing 10 tons to the acre are very few, and to secure this phenomenal yield the most modern scientific methods are employed from the time the cane is planted until the sugar is turned out of the centrifugals bagged for market. Fertilizing on a large scale is necessary, and the most elaborate and costly systems of irrigation are employed. It is a mooted question whether the increased yield compensates for the enormous capital outlay and operating expenses incurred. The irrigating plants alone are valued at more than the immense mill plants and cost more to operate in proportion to the power used. We have in mind a contract for the erection of a Hawaiian sugar house where the mill plant cost $450,000 and the pumping plants for the required acreage $550,000.

I just wanted to show the exaggeration of that statement, because all the arguments seem to be built on such air castles as those comparing our yield in the Philippines with the most phenomenal artificial yield in the world.

The CHAIRMAN. I understand that the yield at the Ewa plantation in Hawaii was between 11 and 12 tons to the acre.

Mr. REA. Yes; that is the Ewa plantation. But it is operated at such an enormous cost that one of the stockholders told me, "We don't know, Mr. Rea, whether it is profitable for us to continue along those lines or not." (Continuing:)

The Hawaiian plantation depending for its water upon the natural rainfall will yield the average of 2 to 2½ tons of sugar per acre. To state that the Philippines are more productive than Hawaii, in comparison with the yield of 10 to 11 tons, is grossly incorrect, and even when we take the normal average under natural conditions of 2 tons to the acre, we are confident that the Philippines can not pass much beyond it except on virgin soils, and by virgin soils we mean cleared forests and not the grassy bottom lands.

Granted that the islands can produce 2 tons of sugar to the acre. To secure this yield the most modern machinery and mills must be employed. At present not 2 tons are produced.

This constant struggle of the home sugar industry to preserve the home market for its own tardy development appears to us somewhat like the little boy whose eyes were bigger than his stomach. It is a commercial impossibility for the beet industry to keep pace with the increase in consumption, let alone trying to hog the whole market. For several years we have heard the crying and yelling of the infant above all other sounds in the national legislative chamber. "Protect us from the bugaboo man in the Philippines!" has been the constant cry. "We can supply all the sugar needed for the home consumption if you will only put a high fence around the little brown ogre, so he can't eat us up." And the baby has been petted and given its sugar pap, and has clapped its hands and goo-gooed in glee. But it has not made good.

Although the consumption of sugar in the United States increased over 500,000 tons in the 5 yrs. from 1898 to 1902, the baby only contributed 100,000 tons to the increase. In 1900 the consumption increased nearly 90,000 tons over the preceding yrs. The "kid" contributed with 20,000 tons. The consumption nearly doubled in 12 yrs, from 1890 to 1902, or to be more exact, it jumped from 1,476,377 tons to 2,566,108, and the demand is steadily increasing. Of the latter figure only about 500,000 tons were produced in the United States; the balance imported.

To return to the question. I ask you, gentlemen, is it fair to compare the Philippines with countries lying on the other side of the world, and ignoring the differences in race, climate, and location? Because 10 to 12 tons can be produced by artificial stimulation in Hawaii, is it fair to assume that it can be done in the Islands? Is it not a fact that only in a few places in Hawaii is this extraordinary result obtained, and is it not clearly apparent that it is due entirely to purely local conditions of soil and climate? If not, would not the same yield be secured in other parts of the same islands?

Is it not a fact that under normal conditions in Hawaii, without the aid of fertilization or irrigation, the yield per acre is about the same as it is in other tropical cane-sugar countries? To assume that the same climate and soil conditions exist in the Philippines as will yield 12 tons of sugar per acre, without the slightest attempt at experiment or investigation, and to stand up here in our national legislative halls and pronounce it a fact, is, in my mind, the limit.

I know that some of you will say that the climatic conditions must be the same, as the islands are just under the Tropics, the same as Hawaii and Cuba. But it don't follow, just the same. Why is it that hemp will grow only in the Philippines, despite the many attempts to force its growth in other nearby islands? Soil conditions can be chemically corrected by modern scientists, so that it can't be attributed to that cause, and we are left with the only logical explanation that the climatic conditions in the Philippines are peculiar to themselves.

The CHAIRMAN. That is the only place in the world where hemp will grow, that kind of hemp, the abaca?

Mr. REA. Yes.

Can our friends explain why it is that ordinary lands in Cuba will grow six rattoon crops and new virgin lands fifteen, while in the adjoining island of Porto Rico they only secure two rattoon crops and a lower tonnage per acre? Or why is it that in Hawaii, with all modern aids to cultivation, they can secure only two volunteer crops?

Gentlemen, I think I can safely take the stand that the climatic conditions in the Islands are such as make it impossible to grow more than two rattoon crops, and these only on new lands in the interior, where the extra cost of transportation to the coast more than counteracts any benefits which might be saved in the cost of a yearly planting.

When our poetical experts of the opposition stand up here and state that 10 or more rattoon crops can be secured from lands in the Philippines they give voice to an opinion which has no foundation in fact, or any possible explanation to justify it in the future. Hot air, gentlemen, pure and simple!

Now, again, I will show to the satisfaction of the committee and to the satisfaction of any cane-sugar expert just why, under existing conditions, it is impossible to grow profitable rattoon crops in the Philippines, even if we allow that the lands could produce them. I don't suppose Mr. Hathaway or his friend noted these facts, for if they did and knew their business they would have seen what the trouble was immediately.

Now, in Cuba, where cane grows like a weed, and where they hold the record for rattoon crops, the cane rows are at least 6 ft. apart and 3 to 6 ft. between seed or hills.

You want to remember that, gentlemen. That is an important item. This gives ample space for the roots to spread and absorb nourishment from the soil. After the first cutting the root has a further chance to spread until it reaches its maximum. As all the mills are modern, employing green bagasse furnaces under the boilers, they have an ample supply of fuel from the crushed bagasse, so that in cutting the cane in the fields the green tops are cut off and left to lie on the ground. These tops form a carpet of several inches in thickness and are allowed to lie there and rot, fertilizing the soil, and by covering the ground as they do they help to retain the moisture and prevent the growth of grass and weeds.

This is one of the conditions which go toward assisting in the growth of profitable rattoon crops in Cuba. Now let us look at the fields in the Philippines, bearing in mind that the mills are of the crudest type and that the *bagasse* after milling has to be dried in the sun before being employed as fuel, and where they have to employ, in addition, the dried green tops also for fuel.

In the Philippines the system employed is to plant in rows averaging 3 ft. apart, and some as near as 2½ ft., and 1 ft. between seed. You want to remember that, too. It is clearly apparent that the root has not sufficient space to expand in or sufficient soil to give it the necessary nourishment after

the first yr., and it also explains why the yield per acre is as low as it is. It also explains why in the few cases where rattoons have been grown they have had to be abandoned as unprofitable after the second yr.

Now, that, gentlemen, is an explanation that I will hold up here, and stand for against any cane-sugar expert in the world.

Mr. CURTIS. Why can they not plant the crop there the same as in Cuba?

Mr. REA. They do not.

Mr. CURTIS. But if they did could they not get more crop?

Mr. REA. I think they might get two crops. I will come to that later.

Mr. CURTIS. I beg pardon.

Mr. REA. I am trying to explain the difference. Now, in cutting the cane for the mill, a man goes ahead cutting off the upper part of the cane for seed and carefully gathering all the tops and leaves. These are all carted to the factory, where the part for seed is cleaned and prepared for planting by immersion in water to cause the eyes to sprout a little, and the leaves are carefully spread out to dry for future use as fuel. Now, it is again apparent, under these conditions, when the field is laid bare to the sun that the moisture is more rapidly absorbed, taking it away from the new sprouts, and the grass and weeds given free rein to grow, thus necessitating the same amount of cultivation and hoeing as the initial crop. With the decreased yield per acre, owing to insufficient nourishment to the root, and the increase in cultivation, it will be seen that the saving in a rattoon crop is hardly sufficient to induce the Philippine planter to continue the practice.

It must also be borne in mind that these rattoons are only grown in the newer lands, removed from the coast; for in the older lands they not only can not grow rattoons, but are limited to one crop of cane every 2 yrs.

That is a point that the beet-sugar people have never dilated on here. They have never brought it to the attention of this committee that the average crop is grown every 2 yrs.

Mr. CLARK. Why is that?

Mr. REA. Because in many places the soil is so poor that they can not do it. In some places the soil is not 1 ft. deep. I turned it over to see myself.

Mr. WILLIAM ALDEN SMITH. Suppose it was fertilized. What effect would that have?

Mr. REA. I do not think it would have any effect at all. The enormous rainfall would wash it out.

Mr. CLARK. Do these rains come all at once, or are they distributed somewhat evenly?

Mr. REA. They come along 6 mos. in 1 yr. pretty regularly.

Mr. CLARK. Do they have 6 mos. wet and 6 mos. dry?

Mr. REA. Yes; sometimes it rains for four or five days at a time, and it simply floods you out. In Manila you have to go around in a *banca* at times.

Mr. CLARK. What is a *banca*?

Mr. REA. A little dugout boat.

Now, a question arises here which the gentleman has asked me and which seems to bother many in the Philippines: Can Philippine virgin land grow more than one rattoon crop under an improved system of cultivation? I assert, gentlemen, that the question is one which must be left to time to decide.

Mr. CLARK. Why couldn't you find that out by inquiry? Surely some people have been there quite a long while, and some surely ought to be worthy of belief. Why can't you ascertain that from these people over there just as well as by staying there yourself?

Mr. REA. I could never find out that they got more than one rattoon crop.

Mr. CLARK. Is that your opinion, sir, that they can not get more than one?

Mr. REA. I think they might get two. That is my private opinion, based upon my observations as a cane-sugar man. I would like to be able to state that in my opinion they could get more, but, unlike our friends, I value my opinion and do not care to have it challenged later on; but if, instead of comparing the Islands to Cuba, Hawaii, and other parts of this continent, we take a more liberal view and compare them with adjacent lands in the same part of the world, having the same general characteristics and geological formation and origin, a more commonsense idea can be formed of what the possibilities are.

Mr. WILLIAM ALDEN SMITH. You are giving your information as an expert?

Mr. REA. Yes. I have been in the sugar business for quite a while, and expect to remain in it.

Mr. CLARK. Suppose this land over there plays out, is there any way of restoring that land, as there is down in Virginia, by fertilizing and cultivating and sowing cowpeas, etc.

Mr. REA. I do not know about that. It has never been tried there. It remains to be proven. Mr. Welborn can give us more light on that than anybody else. The Filipinos never use fertilizers. That is a question, however, that has got to be developed by actual practice.

Suppose we take a more liberal view.

Let us leave Cuba and Hawaii out of the question, and make our comparison with the Malay Peninsula and Java, which all belong to the same group and are washed by the same sea. The same race inhabits them, and in all general characteristics they are the same.

What do we find is the case in Java? Here they have no rattoons, but plant their cane once a yr., and their average cost of production is about 1¼ cts. per lb., or, despite the difference in location, climate, soil conditions, and cheaper wages, about the same cost as obtains in the best-equipped centrals in Cuba. It will be seen that the advantage enjoyed by Java in having cheaper labor, as compared with Cuba, is entirely offset by the climatic and crop conditions, which force their planters to plant once a yr. instead of every 6 yrs. as in Cuba.

Now, it is generally conceded that the manufacture of cane sugar is at its highest development in Java, leading the world in its mill and sugar-house results, though behind Hawaii in the development of soil conditions. In Java they have their forced-labor system, and also are free to import labor from China or India. In fact, all conditions there are ideal, but their cost is about the same as Cuba, or 1¼ cts. per lb. One and a quarter cts. per lb. for 96° sugar.

Mr. CURTIS. Ninety-six?

Mr. REA. Yes; 1¼ cts. per lb. for 96° sugar.

Now, if we are going to deal in futures is it not more to the point to accept Java or the Straits Settlements as our standard of comparison? If in the dim and distant future capitalists can be induced to go into the sugar business in the Philippines, installing modern, up-to-date plants and equipments, is it not just to compare their probable results with what is being accomplished just across the Sulu Sea with a similar race and lands geologically and geographically similar?

Mr. BOUTELL. Have you been in Java?

Mr. REA. No, sir; but I am fairly conversant with the conditions there. I have correspondents in Java who keep me posted on conditions there.

The tendency in the Philippines is toward a higher rate of wages, and the wages, which now average 25 cts., will increase to the wages paid in the cities, or 50 cts. At the present time the average wage paid to the laborer in the Philippines is more than is paid to the Javanese. What is the sense in comparing us with the best results in Cuba or Hawaii?

Let me read you a recent clipping on this subject, which will shed more light on the subject. This appeared in the *Louisiana Planter and Sugar Manufacturer* of November 12th, 1904. It is pretty nearly correct, because I compared that with data contained in other letters which I got, and which I published in my paper, from people who are interested in sugar whom I met at Hongkong and at Shanghai. This gentleman writes from Java. I would like to read to you half a column of this, because it is pertinent to the point I want to bring out.

Mr. WILLIAM ALDEN SMITH. What are you reading from?

Mr. REA. From the *Louisiana Planter and Sugar Manufacturer*, the official organ of the Louisiana sugar interests, under date of November 12th, 1904. This correspondent says—coming right down to the point—he says [reading]:

> So far I have not discovered trades unions in Java, and the contrast between wages here and in Australia is painful. It is difficult to find a man in Australia and New Zealand who is not making $2 or more for eight hours' work. Here there are millions who are glad to get 20 cts. for 10 hrs. work. It is only in the cities that the men receive as much as this. In the mountainous regions of the Preanger I saw men and women laboring for less than 1 c. per hr., and in the tea plantations the regular wages are 7 cts. a day for 6 hrs.' work. On the railways the trackmen get 14 cts. gold a day, and on the government farms they receive less. Here in Soerabaya some common laborers get 16 cts. a day, and this is considered high wages.

I simply wanted to bring out that point of wages, because it corresponds with other data that I have secured on the subject. Now, it stands to reason, gentlemen, that the wage rate of Java will never ascend higher than it is at the present time.

Mr. WILLIAM ALDEN SMITH. On that point of wages you admit, if we are to have a domestic sugar industry, we will have to have protection against that kind of a condition?

Mr. REA. That all depends on the cost.

Mr. WILLIAM ALDEN SMITH. I do not want to interrupt you, but I want to know if we must not have protection against that kind of labor?

Mr. REA. No; I do not think you need it, according to statements already published by your people—by the beet-sugar people, I mean. Pardon me——

Mr. WILLIAM ALDEN SMITH. Those are my people.

Mr. REA. I say it stands to reason that the wage rate in Java will never ascend much higher than it is at present, for the population of the Island numbers over 28,000,000, packed in an area of 50,000 sq. ms., while the Philippines, with an area of 122,000 sq. ms., has a population of only 8,000,000. I merely cite these figures to show that while we may look for an increase in the Philippine wage in the future, thus increasing the cost of making sugar there, as compared with our next-door neighbor, the wage in Java will undoubtedly drop lower, placing the Philippine Islands at a disadvantage; so that, when the experts of the opposition presume to come before this committee and state that with the passage of this bill and the reduction of the duties and under modern methods our cost will go down below 1 c., they are talking without a thorough study of the subject.

Now, I am not going to finish this phase of my argument without giving the committee actual proof that what I am stating is correct, and what we may reasonably expect will happen in the Philippines under a system of modern culture and manufacture.

I think no one here will contradict me when I state that the Malay of the Straits Settlements or the peninsula is of the same race and nature as his brother in the Philippines, and we know from observation that his aversion to work is quite as strong. The Straits Settlements, for industrial purposes, are in a class by themselves. The ports are free and open, and they are not hampered by any exclusion laws. The planters there apparently have their pick of labor, but it is nevertheless a fact that, owing to the low rate of wages offered for work in the fields, the natives refuse to enter into the employ of the planters, and take to the more remunerative and less arduous work of the tin mines. The Chinese will not work for the wage offered, approximating 36 cts. Mexican, or 18 cts. gold per day, so the planters have to import their labor from India, under contract for 3 yrs., paying their passage both ways, and even then they find the labor question confronting them at every step.

Mr. CLARK. Will it interrupt you to ask you a question there? Is it true that all the American citizens in the Philippine Islands are clamoring for the Chinese coolies to be let in there?

Mr. REA. No, sir; they are not; none that I have met. A few of them may be who probably do not understand the situation.

Now, I would like to submit for the study of the committee the last yr.'s report of the Perak Sugar Cultivation Company (Limited). This is a stock company with a capital of 350,000 taels with a par value of 50 taels each, operating under the corporation laws of Hongkong. Its shares are listed on the Far Eastern exchanges, and their value at the last quotation was above par, or 68 taels. Their property is located at Perak, in the Straits Settlements, and consists of two sugar estates, one operating as a *muscovado* estate and the other equipped with a mill, evaporating apparatus, vacuum pan, and centrifugals, making centrifugal, or about 96°, sugar.

Their last report, dated November 1st, 1905, which I received in Shanghai from the secretary of the company, states that the crop of centrifugal sugars from the Gula estate totaled up 39,485 piculs, for which they received an average net price of $6 58 per picul, and the output of their Klompong estate, making basket, or brown, sugar, was 27,199 piculs, for which they received an average net price of $3.89 Mexican. The total production of both estates was 66,684 piculs. The picul of China and the Straits Settlements is about 133 pounds, a little less than the Spanish picul of 137.5 pounds, or 5½ *arrobas*, in use in the Philippines, which makes the total output 8,868,792 lbs.

On the next page of the report we find, from the statement of working account for the yr.: The cost of operating the estate and producing the above amount was 223,664 taels. The tael, or Chinese monetary unit, is equivalent to about 66 cts. gold. So we find that it cost them $147,618.24 to produce the crop, or approximately 0.017 c. per lb.

Let me read the details of this cost. They will interest you and will prove that there are other items in addition to mere labor which go into the cost of sugar.

They state here the working account for the season ending July 31st, 1905. To general charges, the estate, 3,756.67 taels; Penang, 1,305.21 taels; Shanghai, 279.33 taels, making the general charges 5,349 taels, office charges. Then there are the launch expenses, 5,349 taels, the launch being used in going up to Penang; hospital charges, 10,908 taels; salaries, 36 346 taels; manufacturing expenses, 40,857 taels; labor, 82,024; upkeep of buildings, repairs and renewals, 17,983 taels; cultivation (manure, etc.), 19,796 taels; fire insurance, 3,367 taels; directors and officers' fees, less transfer fees collected, 1,858 taels; or a total cost of 223,664 taels.

You will note that the item under the head of labor is enormous, or about 35 per cent of the total; but this does not represent the cost of labor in the fields and factory, as that cost is taken up under its own heading. These 82,024 taels represent only the expense involved in transporting labor.

Turning over to the first page of one of the reports, we find under the head "Labor" the explanation and meaning of this. They state in this report:

> Both estates have had a full supply of labor during the season to replace time-expired coolies; 605 new coolies have been imported, and, following the system adopted last year, a proportion of the cost of importation commensurate with the unexpired portion of the contracts has been carried forward as a charge on next season's accounts.

I have been informed by the secretary of the company that these laborers receive about 40 cts. Mexican per day and *chow*, which means food over there, or approximately the same as we pay in the islands to the same class of labor. We are getting down now to the point as to all this outcry about the Philippines, and to prove and bear out our assertion of cost as compared with the places in the immediate neighborhood. If we deduct the 82,024 taels from the total cost of 223,664 taels, we will get 141,640 taels as the cost of raising this sugar, providing the labor was on the ground. Thus we can see that with labor at 20 cts. gold a day operating with modern machinery and a yield of 1.6 tons per acre the cost is about 0.011 c. per lb. These figures are given without adding in the interest, depreciation, etc.

This is a fair sample of the great bogy industry conjured up by the American interests to prevent the passage of this bill.

If you ask me as an expert what it would eventually cost, under a central factory system, to produce a pound of sugar in the Philippines, I should say 0.015 c., or practically the same as in Java, Cuba, Hawaii; and elsewhere, and practically the same as it is now costing under the old antiquated methods in vogue. That is exclusive of interest charges, depreciation, loss of capital, etc. So when Mr. De la Rama or other gentlemen state that it now costs them 1½ cts. without interest, etc., they speak the truth.

Now, you naturally ask, why is it that with a modern mill extracting double the amount of sugar, and a possible increase in yield per acre—why does not the cost cut itself in half in proportion? It would, if the cost was all labor, as is now the case, but our friends forget that whereas the labor price remains the same, the cost of administration, engineers, chemists, sugar boilers, locomotive drivers, defecator men, filter press men, and the many other high-class technical and skilled assistants come into prominence and overshadow mere labor cost. You will note in the report of the Perak Sugar Company that the item of salaries amounts to 36,346 taels, or 1[6 of the total cost, and this only includes the manager and clerical and field staff, as the salaries of engineers and sugar boilers, etc., are included under the proper head of manufacturing.

I think I have demonstrated to the satisfaction of the committee what the probable result in the cost of sugar in the Philippines will come to ultimately, under the most favorable conditions, but it must always be borne in mind that just so sure as an industrial development takes place in the Islands, just so sure will our wage rate increase. Before any action could be taken in building a central factory, or in a yr. or so, the wage rate will have nearly doubled, this owing to the commencement of work on railroad construction which will call for an army of labor. So conditions are bound to change, and to the great detriment of the sugar industry if relief measures are not given in the tariff.

Now, there is another point which I want to bring out before you to show what we might be able to do in the Islands under the most favorable conditions, and comparing it with Java to prove my assertions.

The cost price of Java sugars, as stated, is about 0.0125 c. per lb. on the wage basis of 20 cts. Mexican or 10 cts. gold per day, and a yield per acre of about 40 tons of cane or 4 tons of sugar. Those are the best conditions, the cheapest class of labor, and the lowest cost of producing raw sugar in the world.

Now, Mr. De la Rama states that the average yield per acre is about 1 ton of low-grade sugar in the Philippines, in which he is borne out by the official census for 1902 (and I think that whenever we are in doubt we should take the Philippine census, because it comes pretty near being right), which gives the average of 2,800 lbs., or little over a ton, per acre as the yield in Negros. An estate operating under the *muscovado* system, or this process which we employ—

Mr. McCLEARY. That is unrefined sugar?

Mr. REA. Yes, sir; or with only one small mill and open-boiling pans secures on an average of 5 per cent in sugar on the weight of the cane. In Louisiana the percentage is 4½, while in some parts of Cuba and the West Indies it will run up to 5½—5¾, according to the density of the juice in the cane. This data, known to all engineers, is the only method of approximating the yield in cane per acre where no scales are employed for weighing.

So in the Islands, where scales are unknown, it is apparent that the yield of 1 ton of *muscovado* sugar per acre is 5 per cent of the cane in the field, which gives us 20 tons of cane as the average yield per acre, and this not every yr. but every other yr. I think that is about right from personal observation. I have driven around the cane fields.

So with modern up-to-date machinery, 9-roller mills and crushers, defecators, multiple evaporators, vacuum pans, crystallizer, centrifugals, under expert administration and chemical control, the best that can be secured is 12 per cent on the weight of the cane, though the average is 10 per cent. So that with our present soil conditions, producing 20 tons of cane per acre, the best we can hope to do in the future is to obtain 2 tons of centrifugal sugar in place of the present ton, as against 4 tons of sugar in Java. So if it costs 1¼ cts. in Java with labor at 10 cts. on a yield of 4 tons, it will cost more like 2 cts. to obtain the same result in the Philippines with a yield of only 2 tons and granting the same wage rate. That is the kind of stuff these beet-sugar fellows want to get at. They ought to have brought it up long ago. If we raise this wage rate from its present stage of 20 cts. to 50 cts. our cost will go up in proportion. When I state, then, that the probable cost of making sugar under modern conditions will be about 1½ cts., I am still taking long chances, unless we can materially improve the production of our fields, and in new regions this may be possible, but never in the older regions of Negros or Pampanga.

Now, I have cited the lowest cost of producing sugar in the world, under the most favorable circumstances. Will anyone please explain to this committee how it is going to be possible for the Philippine planter, paying 50 cts. per day and a yield of 2 tons per acre, to compete with the Java farmer, whose forced labor by the government costs only 10 cts. and his yield double that of the Philippine planter? Will anyone again state before this committee that the passage of this bill will result in the Philippines growing sugar at a cost of 1 c. per lb. downward?

Now, I have finished that phase of the question.

The most important statement ever placed before this committee is here, and I want to submit it. I have a little pamphlet entitled *Should the United States Tariff on Philippine Sugar and Tobacco be Reduced?* and your name (addressing Mr. Palmer) is attached to it. You admit the authorship of it?

Mr. T. G. PALMER. I have not seen what you have. I wrote something with such a title.

Mr. REA. This pamphlet has this heading: "American Beet Sugar Association, office of the secretary, Ebbitt House, Washington, D. C." It is signed by your name. It is a printed pamphlet, which, apparently, was sent to the members of the association to get them together to urge Congress to defeat this bill.

The CHAIRMAN. What is the date of that pamphlet?

Mr. REA. December 29th, 1904. It came to me through the mails in January of this yr., and I have kept it ever since.

Mr. DALZELL. Is it a printed pamphlet?

Mr. REA. Yes, sir.

Mr. T. G. PALMER. I would be glad to have it go into the record.

Mr. REA. I have no objection. There is only one point I wish to emphasize, I do not think the committee has time to listen to all the rest. I do not think you care to have it all read. What I am going to read is a sufficient answer to all the arguments that have been brought forth by the beet-sugar interests in this country in opposing this bill. On page 15 of the pamphlet, the paragraph entitled "Future Cost of Production of Sugar from American Grown Beets," Mr. Palmer states:

> I take it that further Philippine tariff reduction is likely to come in due course of time, but it should not

come until the Philippines greatly raise their wage rate on sugar haciendas and become at least semicivilized, and until the brains and capital already engaged in the home industry, and which will come to it under favorable circumstances if let alone, enable us to perfect the various improvements now under way.

Mr. Palmer starts off by assuming that this tariff reduction has got to come.

Two yrs. ago I wrote you at length concerning my suggestion of producing single-germ seed. The work was begun immediately by the Government, and the first crop of seed from beets grown from 2,500 selected single-germ beet balls has just been harvested. I understand that 30 per cent of this seed came single germ, and the expectation is that in 4 to 6 yrs. more it will be an established thing—

Just keep that length of time in your minds—"In 4 to 6 yrs. it will be an established thing;" one year has already gone by—

saving the farmers $6 per acre of actual labor, eliminating the hand work of thinning on hands and knees, and at least doubling the tonnage per acre on account of no injury being done to the remaining beets by hoeing out the superfluous ones, each plant standing 1 to 3 ins. apart, depending upon how closely the seed is drilled in. If the sugar beets which the farmer now sells to the factory at an average price of $5 per ton costs him $3.50 per ton to produce, his crop grown from single-germ beet balls should not cost him to exceed $1.50 per ton.

The government has taken charge of the scientific work of one of our large sugar-beet seed farms in the State of Washington, and expects to be able to produce a strain of seed as high in sugar content as the best beets selected at the outset, which is 25 to 28 per cent. These mother beets should give factory beets of 23 per cent sugar, and with a loss in extraction of 3 per cent would enable the factory to turn out 400 lbs. of granulated per ton of beets. According to the government report on the home-sugar industry for 1902, the average amount of sugar extracted per ton of beets was 221 lbs.; hence this anticipated extra production of 179 lbs. would nearly cut in two the present factory cost of producing sugar from American-grown beets.

Doctor Wiley, Chief of the Bureau of Chemistry, Department of Agriculture, is to experiment this coming mo. with sugar "concrete," and, if successful, each factory, by increasing its investment 25 per cent, can operate three near-by concrete plants, shipping in the "concrete" to the main factory after the local campaign has been concluded, and thus operating the year through and quadrupling its product, which would greatly lessen the cost of production.

Experiments are being made this yr. with an invention designed to remove the impurities of the juice at the outset instead of from the waste molasses after coming down through all the various processes, the inventor claiming that it will reduce the cost of a beet-sugar plant by 50 per cent, the labor to operate it by 33⅓ per cent, yield an average excess of 20 lbs. of sugar per ton of beets, besides saving several valuable by-products.

All these matters lead to an eventual cost of production of granulated sugar from American-grown beets of something like 2 cts. per lb., but it takes not only money and brains to perfect these improvements, it takes time.

We have the time in 4 to 6 yrs. Now, as all this discussion is hinged on what the possibilities of the industry in the Philippines will be in about the same time, or in the next few yrs., it is clearly apparent from Mr. Palmer's statements that the beet-sugar industry, producing granulated sugar at 2 cts., needs no protection from the raw product of the Islands, which, under the most favorable circumstances of soil, crop, and yield, with modern mills will cost, landed at Iloilo, about 1½ cts. per lb. Add 0.003 freight and insurance, 0.0042 duty, and we have 0.022, to which must again be added the cost of refining and refiner's profit, or something like 3 cts. per lb., before it can compete with the 2 cts. cost of the home article.

Mr. T. G. PALMER. That is single-germ seed.

The CHAIRMAN. We will hear you afterwards, Mr. Palmer. Mr. Rea can go on now. Proceed, Mr. Rea.

Mr. REA. Mr. Palmer continues:

We can offer the Philippine Islands a perpetual market for nearly $200,000,000 worth of purely tropical products annually. But whatever magnitude their sugar industry may reach, those who put their money into it will some day be compelled to fight a battle royal with the educated, scientific American farmer, which will be costly for both and ruinous for one. Never in the history of the world has the nervous energy of the Temperate Zone succumbed to the listless workers of the Tropics, and it remains to be seen whether or not the sugar industry is to furnish the exception. Wise legislation would render such a battle unnecessary and with profit to all concerned. Unwise legislation will surely precipitate it and bring want and sacrifices to both.

Elaborating this further, Mr. Palmer say

A Philippine tariff reduction at the present moment would check all growth of the industry and perhaps result in its complete and early ruination, the bulk of the loss eventually falling upon the farmers. If left alone as at present and given a chance to develop, a few yrs. hence the home industry can snap its fingers at tariff schedules; the American people will be purchasing their sugar at the lowest price known in the world, and every dollar of the $140,000,000 they now annually spend abroad for sugar will be kept at home and will come back to them.

There is one thing you want to stop and think of—to get clearly in your minds—that the beet-sugar people within a few yrs. are going to produce refined sugar inside the tariff wall at 2 cts. a lb. Stop to think what is going to happen to the rest of the world. It costs Mr. Havemeyer and the big refining industry 2 cts. per lb. to purchase raw sugar. Add 1.68 cts. a pound duty and the cost to refine and the profit, the refiner can not handle sugar for less than 4½ cts. per lb. When beet sugar goes down to 2 cts. per lb. what is going to happen to the refineries? You will have them down here yelling for free raw sugar, and cause the whole protection edifice to tremble. What is going to happen to the Louisiana people? What is going to happen to Hawaii and Porto Rico? They have all got to go out of business, because they can never compete with the price of 2 cts. per lb. Cuba can not compete with that price, and what will happen down there? You will have a revolution on your hands. If they do not revolt, the American sugar interests will put up a couple of hundred thousand dollars and see that they do revolt.

Mr. DALZELL. If the rest of that pamphlet is as patriotic as that you read, I think we should have it all in the record.

Mr. REA. There is more of it and there are other items of interest.

Mr. DALZELL. I think that the whole of that pamphlet had better be put into the record.

Mr. REA. Very well, it can go in the record.

You all probably know what the effect of a 2 c. beet-sugar rate is going to have on all the rest of the home sugar interests. What will happen to Havemeyer, Hawaii, Louisiana, and Porto Rico, and what is going to happen down in Cuba? Do not forget the troubles down in Cuba. Any great disturbance on the sugar market is going to breed internal disorders and force armed intervention, and you will have to take the island over on your hands.

Mr. CLARK. As to Java, did I not understand you to say that the Government makes the people work over there?

Mr. REA. Yes, sir.

Mr. CLARK. And makes them work for 10 cts. a day?

Mr. REA. I put it at 20 cts. a day. I know that to be a fact.

Mr. CLARK. How much does the Dutch sugar farmer pay?

Mr. REA. Twenty cts. Mexican.

Mr. CLARK. That is 10 cts. of our money?

Mr. REA. Yes, sir. I know they make sugar there for 1¼ cts. per lb. That is the average cost of production in the Island of Java.

Mr. MCCLEARY. That is unrefined sugar?

Mr. REA. Yes, sir. Our refineries get a chance at that.

There are one or two more points which I would like to bring out. Figuring on the probable increase in our crop in the Philippines within, say, 4 to 6 yrs., I want to say that it would be a mechanical impossibility to draw up the plans, contract for the machinery, build the machinery, ship it to the Philippines, and put a good modern plant in operation in less than 3 yrs. Every one of these gentlemen knows that it could not be done. It is an impossibility. Provided they have the land or have options on the land already, and if they started right now it would take them three years before they got the plant in operation.

Mr. CLARK. Suppose they take a wild piece of land that has never been cultivated—the timber has never been cut off—and undertake to make a sugar plantation there, how long would it take to get the first crop off of it?

Mr. REA. Three yrs.

Mr. CLARK. Why would it take any such length of time as that?

Mr. REA. In the first place the trees have to be cut down and then burned off and sufficient acreage planted the first yr. to have seed to plant the greater acreage for his main crop.

Mr. CLARK. Why can not he buy the seed?

Mr. REA. It would be difficult to purchase, besides it will take at least 2 yrs. to build this machinery.

Mr. CLARK. Where were you raised?

Mr. REA. In New York.

Mr. CLARK. You take in the timber country out West—and it is true, I presume, in the East—the first yr. they skin off the timber and the next yr. they put in a crop. What is the reason they can not do it there?

Mr. REA. There is the machinery to be installed.

Mr. CLARK. You do not need any but the ax.

Mr. REA. You asked me how long it would take to start a modern plantation there?

Mr. CLARK. How long it would take to skin off the timber and start the first crop?

Mr. REA. About 18 mos. for any extensive area of land.

Mr. WILLIAM ALDEN SMITH. The sugar land is not timbered land, is it?

Mr. REA. What the people call "sugar land" is not timbered. If I were going into the sugar business in the Philippine Islands, I would buy timber lands, and I think in our experience in Cuba after the war sugar men gave the go-by to the old worn-out lands in Matanzas and Habana provinces and went to the eastern end of the island and bought new virgin lands covered with forests—at least the gentlemen I represented. We had a large contract with Mr. Havemeyer for the erection of a sugar mill.

Mr. CLARK. You could not raise but one crop in 2 yrs. because the land was not rich enough?

Mr. REA. Yes, sir.

Mr. CLARK. How does it help the land any to give it a rest for a year?

Mr. REA. It gives it a chance to recuperate.

Mr. NEEDHAM. How much did you have to pay for that sugar land in Cuba?

Mr. REA. I do not think I am at liberty to say what we bought it for, but I can state that lands can be bought for less than $5 an acre. It has been repeatedly urged that immediately on the passage of this bill the American capitalists are going over into the Islands, down into the Island of Negros, and buy up those old worn-out sugar lands, which their owners hold at $40 or $50 gold per acre. That is their assessed value. Is it reasonable to suppose that sugar men will buy that land when they can go down to Cuba and secure the best lands in the world for $5 or less an acre? I know it can be bought in Cuba for that price and is being bought now, while in the Philippines if we can induce any of our capitalists to go out and buy the absolutely virgin land in some of the near-by islands it will take time to develop it—at least 4 or 5 yrs.

Mr. Palmer spoke about the great fertility and possibilities of the Island of Mindanao. I do not know whether Mr. Palmer knows it or not, but our labor question in Mindanao is very acute and, as a matter of fact, we can not get the Filipinos—that is, the Christian native—to go down there and work. The Mindanao Moro has a very effective method of dealing with his Christian brother. They do not migrate down there and you can not induce them to.

The CHAIRMAN. There is a very strong prejudice and there would be a war in a minute.

Mr. REA. The war would be one-sided, to the detriment of Filipino labor.

The CHAIRMAN. There would not be any more Filipino laborers?

Mr. REA. No, sir.

Mr. CLARK. Perhaps we had better send them all down there; I do not know,

Mr. WILLIAM ALDEN SMITH. How long have you been in the Philippines?

Mr. REA. Two yrs.

Mr. WILLIAM ALDEN SMITH. Where were you before you went to the Islands?

Mr. REA. In New York, and previous to that I spent 4 mos. in Porto Rico helping to make contracts for the location of a large sugar factory there. Previous to that I represented Mr. O. B. Stillman in Cuba as his manager. He is one of the largest cane-sugar men in the island. He has offices in New York and in Habana, and also represented the Havemeyer interests in Cuba. He is general manager of the Trinidad sugar plantation, one of the largest in Cuba.

Mr. WILLIAM ALDEN SMITH. What is your business in the Philippines?

Mr. REA. I am publisher of THE FAR EASTERN REVIEW, published in Manila.

Mr. WILLIAM ALDEN SMITH. That paper is for absolute free trade between the Philippines and the United States?

Mr. REA. Yes, sir.

Mr. WILLIAM ALDEN SMITH. You are a free trader yourself, are you not?

Mr. REA. I am like Mr. Welborn. I believe in good protection occasionally.

Mr. WILLIAM ALDEN SMITH. But on general principles you are a free trader?

Mr. REA. No; I am a Republican and a protectionist.

Mr. WILLIAM ALDEN SMITH. Your paper advocates free trade?

Mr. REA. Yes, because it is just. It is justice to the Philippine planter and to your fellow-countrymen who are out there doing their country's work trying to educate these people, and who are bearing the brunt of the struggle. They should be given fair play.

Mr. REA. Yes. sir. I am a newspaper man and receive all the newspapers. I have read these things and know what was said. Give us a square deal. That is the only thing that one American can ask from another.

Mr. HILL. You said that you had been several mos. in Porto Rico. Do you know of any reason, from your experience in both countries, why the United States should not extend equal treatment to both countries?

Mr. REA. I see no reason whatever.

HONGKONG AND SHANGHAI BANKING CORPORATION

The ordinary half-yearly general meeting of the shareholders in the Hongkong and Shanghai Banking Corporation was held Saturday, February 24th, at noon, in the city hall at Hongkong. It was presided over by Mr. H. A. Slade, chairman of directors, and there were also present a large number of gentlemen interested in the corporation. The chairman read the report of the directors which gave a general statement of the affairs of the bank, and the balance sheet for 6 mos. ended December 31st, 1905 The report showed that the new profits for the period, including $1,702,728 85, balance brought forward from previous account, after paying all charges, deducting interest paid and making provision for bad and doubtful accounts, amounted to $4.864,395.72. The directors recommended the transfer of $1,000,000 from the profit and loss account to credit of the silver reserve fund, which fund now stands at $9,500,000. After making this transfer and deducting remuneration to directors, there remained for appropriation $3,849,395 72, out of which the directors recommended the payment of a dividend of £1 15s. sterling per share, which at 4/6 will absorb $622,222.22, and a bonus of £1 sterling per share, which at 4/6 will absorb $355.555 55. The difference in exchange between 4/6, the rate at which the dividend and bonus were declared, and 2.09|16, the rate of the day, amounted to $1,171,840.55. The balance $1,699.777.40 was recommended to be carried to the current profit and loss account. In presenting the report, the chairman said:—

GENTLEMEN:—The report which I have read on the half-yr.'s working of the bank is no exception to the favorable statements your directors have had the pleasure of laying before you for many yrs. past, and I think there is no doubt it will meet with your approval. I hope that the proposed distribution of profits will also prove satisfactory to you. We recommend the addition of $10 *lacs* to our silver reserve. In June last we increased the dividend from £1 10|- to £ 1 15|-, and I am glad to say that so far results have warranted that step. We are able to again propose a dividend of £1. 15|- and also a bonus of £1, making a distribution of £4 10|- per share for the yr. As regards the amount of the bonus, while circumstances have again been exceptionally favorable I feel that I must repeat the caution uttered by my predecessor in the chair to the effect that the £1 bonus should not be looked upon as a recurring certainty; more especially in view of the fact that we have since added 10|- a yr. to the ordinary dividend. It is only fitting that I should say at once that the thanks of shareholders are due to our managers. agents and staff generally, and I am sure you will approve of our action in voting them a bonus of 15 per cent on their salaries.

Turning to the balance sheet you will find that our note circulation shows an increase of $30 *lacs* compared with the figures on 30th June last, while silver current accounts are some $60 *lacs* less, reflecting the usual demand for money at the end of the yr. The withdrawal of some of the loan funds temporarily lodged with us in London accounts for the decrease in gold current accounts. Deposits in gold remain practically unchanged, while silver deposits show an increase of $25 *lacs*. Outstandings under the heading of bills payable are $12 *lacs* less than 6 mos. ago. On the other side of the account you will see that we are in a very strong cash position. Coin lodged with the Hongkong Government against excess note issue has risen from $8,500,000 to $10,000,000, our cash shows an increase of $30 *lacs* and we have about $11 *lacs* more bullion in hand and in transit. These increases are mainly accounted for by the expansion in our note issue already referred to and by the preparations made for the usual requirements of trade at this period of the yr. Indian Government rupee paper, and consols, colonial, and other securities stand at $11,344,370.38, against $13,950,599.64 on 30th June. Sterling reserve fund investments remain unchanged. Current exchange is now over 2/-, the rate at which our gold reserve appears in the balance sheet, but any difference on that account is more than counterbalanced by the price at which the sterling investments stand in our books as compared with their market value. Bills receivable are lower by about $13,000,000, and there is a similar reduction in bills discounted, loans, and credits. The dollars totals shown in the balance sheet, although higher than a yr. ago, are less than on 30th June; this, however, is accounted for to a large extent by the rise in the price of silver and the consequent higher level of exchange. The confident expectation that a revival of trade in the Far East would result immediately upon the conclusion of peace between Japan and Russia has not been altogether fulfilled, but though more slowly than was at first anticipated, yet surely the signs of renewed activity appear.

With reference more particularly to the region directly affected by the war it is noteworthy that an agreement has been arrived at between Japan and China which, if interpreted in a wise and statesmanlike spirit, should eventually secure for all the great commercial nations interested the obvious benefit of the maintenance of the open door in Manchuria and equal trading opportunities for all, thus realizing the aim which has been so steadily advocated from this chair for many yrs. We must not forget that it takes considerable time to move large bodies of troops, and this operation has involved the requisitioning of all available means of inland transport, preventing the free distribution of merchandise to the various markets in Manchuria. Notwithstanding these difficulties, however, a considerable business has been done and there seems every reason to expect that on the opening of the Northern ports and with transport available throughout the country, we shall see a greater demand for foreign manufactures and the opening of new and more extended markets in this large and important province.

Gentlemen, the bank continues to improve its position; we have made a good start for the present half-yr., and I think you may safely look forward with confidence to the future. (Applause.)

There were no questions, and the chairman formally moved the adoption of the report and accounts Mr. J. A. Jupp, in seconding he motion, said:—

I feel I am only voicing the sentiments of all shareholders present in congratulating the directors, the chief manager and staff on the splendid results they are again able to place before us. The bonus of 15 per cent of their salaries voted to the staff, I am confident, meets with the very hearty approval of all shareholders. (Applause.) As regards the dividend and bonus proposed to be distributed we have also good reason to be pleased to see a gradual increase of returns to shareholders. We are all relieved, I am sure, that the terrible war which raged for 18 mos. in this part of the world is now a thing of the past and that a revival in trade is beginning to be apparent. The strong position attained by the bank should, I think, be a source of congratulation and pride not only to its shareholders but to the whole colony. The colony and corporation have grown up together, so to speak, and each has contributed to the growth of the other. (Applause.) I cannot, I think, do better, therefore, than conclude these few remarks with the wish that they may long continue to thrive and flourish to their mutual benefit and to the good of us all. I have much pleasure in seconding the adoption of the report and accounts. (Applause.)

Mr. C. H. Thompson moved the re-election of Messrs. H. A. W. Slade, E. Shellim and E. Goetz as directors and the confirmation of the appointment of Mr. C. R. Lenzmann as a director in place of Mr. H. Schubart who has left the colony. Mr. C. H. Rogge seconded. Carried.

Mr. S. Hancock moved the re-election of Messrs. W. Hutton Potts and A. G. Wood as auditors. Captain Tillett seconded. Carried.

Dr. Noble said:—

GENTLEMEN:—Before we part, I would like to ask you to join with me in a hearty vote of thanks to the court of directors, the chief manager, managers and staff, all of whom have labored diligently and faithfully on our behalf. They are each and all deserving of the greatest praise for the able manner in which they have managed the enormous funds entrusted to their care, and the results produced as shown in the accounts just submitted to, and passed by you. As each report is issued I always remark that I cannot imagine how on earth they contain such a standard of excellence. But they do. I, therefore, propose a vote of thanks to the court, the able managers and staff generally. (Applause.)

This terminated the meeting, all present proceeding to the unveiling of the statue of the ex-chief manager, Sir Thomas Jackson.

HONGKONG AND WHAMPOA DOCK CO., LIMITED

The ordinary yearly meeting of the shareholders of this company was held in Hongkong, February 25th, at the offices of the company, Queen's Buildings, and was presided over by the chairman, Sir Paul Chater, Kt., C. M. G., who, after convening the meeting, addressed the gentlemen present as follows:—

GENTLEMEN:—The report and statement of accounts having been in your hands for some days, I will, with your permission, following our usual course, take them as read. The net profits for the half-yr. ending 31st December, 1905, amount to $171,649.83 as compared with $328,200.51 for the first 6 mos. of the yr., and $370,159.03 for the corresponding period of 1904, a falling off which I am sure we all greatly deplore. To this sum must be added the sum of $501,332.27 the balance brought forward from last account, and after deducting directors' and auditors' fees, we have available for appropriation the sum of $662,232.10, which sum your directors propose, subject to your concurrence, to deal with as follows:—To pay a dividend for the half-yr. of 12 per cent or $6 per share, absorbing $300,000, and to carry forward the balance $362,232.10 to a new account. While, as I have already said we must all deplore so poor a result for the past 6 mos., it was, you will recollect, foreshadowed to some extent in my speech to you from this chair in August last, when I said I was afraid, from various causes, we could not look for any substantial improvement in the immediate future, and it is to be regretted that the depression in business then referred to cotinued throughout the remaining mos. of the past yr. Happily, since we last met, the peace between Russia and Japan, then looked forward to, has become accomplished and the improvement in our business confidently expected to result therefrom will, I trust, have become apparent before I have occasion to again address you.

We have not been idle in our efforts to already secure a share of the work to be done in vessels of the Russian Navy, but owing to our No. 1 dock being unable to accommodate their battle ship *Czarewich*, we have so far obtained no work from them worth mentioning, and from this cause also, gentlemen, I regret to say we lost the steamers *Minnesota* and *Dakota* which were obliged to go to Japan to be docked.

The tonnage of ships docked during the last 6 mos. shows a slight falling off of some 290 tons, the figures for merchant vessels stand at 458,312 tons as against 392,731 for the last half-yr., and for war vessels 29,130 as against 95,000, of this latter only some 3,013 tons represent foreign men-of-war, but I hope that, in this connection, we shall see a considerable improvement during the current 6 mos., as we have now on our books four American battleships, and with the resumption of trade with this port by Japanese steamers, we may reasonably expect an increased share of the merchant shipping.

The new work in the shipbuilding yard referred to in my last speech has been carried on satisfactorily; we have completed and delivered the three large steel steam waterboats, a steel water barge for the United States Government at Manila, two large wooden lighters for local use and two small steam tugs for service at neighboring ports. The large steamer for the Yangtsze trade and the cargo lighter for Bangkok are making good progress, and we have recently secured an order for twelve large wooden lighters which, together with various contracts for steel work for the Hongkong Milling Company, cast-iron columns, etc., for new buildings, help to keep our works profitably employed. The work of installing the electric drive in the saw mill is still in progress and will be completed during the present half-yr. on the arrival from home of the motors, and we have now on order an improved planer and a new lathe. The earnings of our dredger *Canton River* are small; the employment which I told you we had in view for her on the completion of her work at Canton having failed of arrangement. The value of materials on hand has increased during the period now under review by some $150,000, mostly for the new Yangtsze steamer now buliding and other contracts.

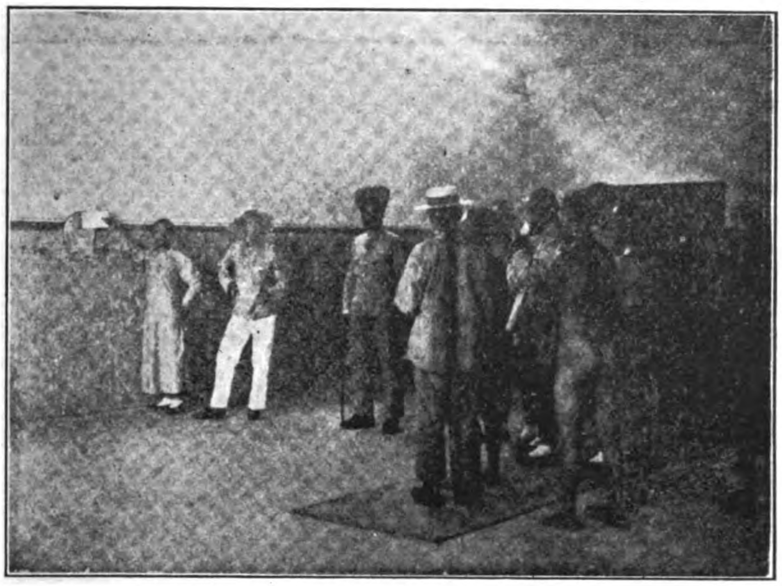
Mr. Salinger proposed and Mr. Parlane seconded the confirmation of the appointment to the board of Mr. G. H. Medhurst, Hon. Mr. C. W. Dickson and Mr. S. Silverstone. Carried.

The re election to the board of Mr. H. P. White and Mr. E. Goetz was carried on the motion of Captain Tillett, seconded by Mr. Wilks.

Messrs. T. Arnold and H. U. Jeffries were re-elected auditors on the motion of Captain Unsworth, seconded by Mr. Leiria.

COLLECTING, PREPARING, AND TRANSPORTING CHINESE LABORERS TO THE TRANSVAAL MINES

In an official report to Washington, Consul-General Ragsdale, of Tientsin, N. China, describes the system established, with the approval of the Government of China, for the enlistment of coolies for work in the mines of the Transvaal. The methods of collecting, preparing, and shipping the Chinese are described,



MEDICAL EXAMINATION

and the agreement as to wages and treatment are explained. The indentured coolies are under contract with the Transvaal Chamber of Mines, and the wages of each are from 1 shilling 6 pence to 2 shillings 6 pence per day, exclusive of subsistence, for the supply of which the contract makes provision.

This new industry has been particularly thrifty in N. China, the coolies being indentured to the Transvaal as unskilled laborers in the gold mines of the Witwatersrand District. Since the close of the S. African war it has been found that the supply of native Kaffir labor was insufficient for the full development of the mines. Unskilled white labor has been tried on some of the mines, and has always resulted in failure, for the following reasons:—

The climate is not suitable for the white man as a laborer.

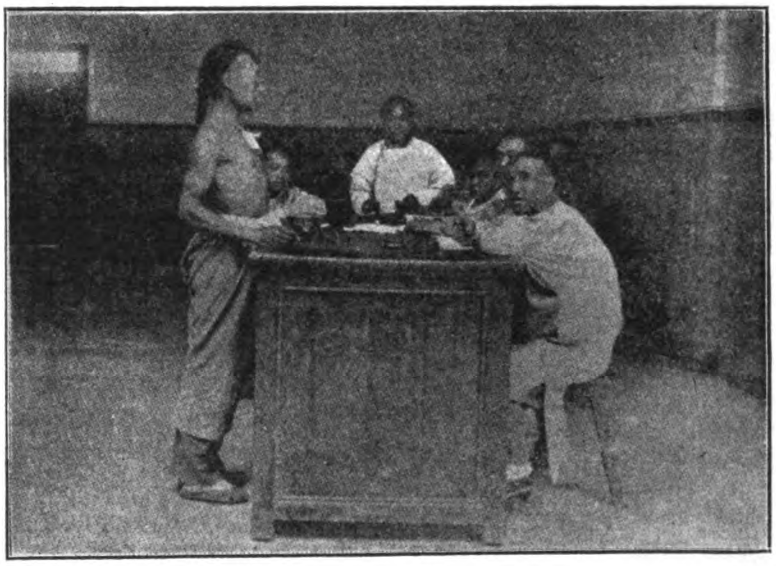
The cost of living is so great, that for a white man to live in decency with his family, the wages necessarily are much greater than the mining conditions will justify and the mines could not be worked. White men working for wages justified by the mines must be content to live in such a manner that they soon become degraded, lose their self-respect, and are known as "white Kaffirs," being as much separated from their own people as are the natives, and, in large numbers this type of poor whites would become a serious social menace.

It has been proven an impossibility for white and black laborers to work side by side.

FAILURE OF INDIAN AND KAFFIR LABOR.—Indian laborers have been tried without success. They are not good miners, can do but a small amount of work, and their strict rules of caste make it difficult to handle large bodies of them in an alien country. When the mines were reopened after the close of the S. African war the schedule of wages was less than before the war. As the lack of labor became a serious matter, the wages were increased in the hopes that the available labor would increase. These hopes did not materialize. The habits and instincts of the Kaffir are the same as the other natives of Africa. None of them are workers beyond what is absolutely necessary for a hand-to-mouth existence. Four or 6 mos.' work in the mines provides them with sufficient means to live the remainder of the yr. The increase of wages instead of improving the labor conditions had an opposite effect, as the Kaffir could obtain the requisite amount of money in less time.

DEFICIENCY IN NATIVE LABOR.—In addition to all this there is the fact that even if the native labor was satisfactory there are not a sufficient number of natives available. The entire population available for native workers is less than 4,700,000. As only those between the ages of 15 and 40 will undertake outside employment, the selection is limited to 10 per cent, or 470,000. Dividing this by two, as the natives will not work more than 6 mos. each yr., there is a total available supply, in the districts where recruiting is allowed, of 235,000. The present shortage in the Transvaal in all industrial and agricultural operations is 220,000. The number of natives employed is 182,000, thus leaving only 53,000 to supply this immediate shortage, of which the shortage in the Transvaal mining industry alone is 130,000. Thus will be seen the necessity of recruiting from some outside sourcer,and from all sources available the most favoable is China, particularly N. China. The Chinese are quiet, sober, hard workers, not given to dissipation of any kind, economical and thrifty, anxious to save all their wages possible and eventually return to China. As competitors in the labor markets of the world they are feared by the white man for their virtues, which are many, and not for their vices, which at present are few

INCEPTION OF THE COOLIE MOVEMENT.—It must be remembered that the cost to the S. African mining companies of the Chinese coolie is much greater than the cost of the Kaffir, and that the profit, if any, will consist in the greater capacity of work in the individual and the increased security of the mine owners against unexpected shortage. This experiment with indentured Chinese labor is the result of a thorough investigation of the labor question by the Transvaal Chamber of Mines, and the carrying on of the work in China is in the hands of a labor importation agency appointed by this chamber of mines. This work was sanctioned by the British Government by the passing of the Transvaal Labor Importation Ordinance. The commissioners of the Transvaal Chamber of Mines arrived in China during the winter of 1903 and at once commenced negotiations with the Chinese Government in Peking for permission to export coolies. After completing in a satisfactory manner these necessary arrangements the commissioners inaugurated the actual work of collecting the coolies. Contracts for this work were given to two British concerns in Tientsin—Messrs. William R. Forbes & Co., and the Chinese Engineering and Mining Company, Ltd. For each coolie delivered at the port of embarkation and passed by the medical examiners a fixed sum is paid these contractors. The contractors pay all cost of collecting the coolies and supplying them with food and transportation to the point of delivery. Any coolies failing to pass the physical examination are a loss to the contractors. The contractors at once through their compradores (Chinese agents) established collecting stations in various parts of the Provinces of Chihli and Shantung, from which went out small agents to preach the gospel of the Transvaal and collect coolies. The first shipments were collected from Tientsin and Tongshan, as the coolies were numerous and near. Later, as the coast supply decreased, the agents pushed inland.



REGISTRATION

METHODS OF COLLECTING.—The inland collecting stations were usually at some town having a resident foreign missionary doctor, who made a preliminary examination of the coolies before

they were sent to the coast. This examination was at the expense of the contractors. The accepted coolies were marched to the nearest railway station and forwarded to the shipping point. In a short time Chinwangtao was made the main shipping point and an immense depot was established there. Near the beach but well above the reaches of the sea was built a large compound, surrounded by a high brick wall. In this compound are 16 separate barracks, each 100'×45', with walls some 20' high. On the two sides of these are two wooden platforms 6' wide, one above the other, extending the entire length of the buildings, which are of brick, plastered on the inside, a lath and plaster ceiling, and cement floors. They contain ample windows and doors and in winter are furnished with large coal stoves; better quarters than the coolies ever had before. Each barrack can furnish quarters for some 400 coolies, and each has a well-built detached kitchen of ample capacity. Along the sea front of the compound are the administration buildings, including the examination rooms, offices, etc. The residences of the foreign employees are built outside of the compound and a econsidrable disthcee from it. At one end barriers are run from tan compound wall across the fine beach to deep water and the coolies have sea bathing when they wish.

Detention and Examination.—The coolies arrive in lots of from 200 to 300 and are placed in a small detention compound. Each one is stripped and examined by the doctors. This physical examination is most thorough, including tests for eyesight and hearing. Those accepted pass into an immense tank of warm water and are scrubbed with soap. They are then vaccinated, photographed, and their identification cards written up. A number is hung about their necks and they are ushered into the large compound, where they remain until the next transport sails. In the meantime they are furnished with a copy of the contract they are to sign both in Chinese and English. At all hrs. of the day special Chinese clerks take them individually and explain each clause of the contract in the simplest manner possible and in every detail, until each coolie understands where he is going, for what purpose, and under what conditions, and in what manner he will be repatriated.

These Chinese instructors are under the control of the Chinese Protector, an official of the British Government in no way connected with the Transvaal mines. His duties are to see that until the coolie leaves China the white man adheres, both in letter and spirit, to his part of the contract; that each coolie understands what engagement he is entering into, and that he enters into this engagement of his own free will and not because of outside pressure. While waiting for the transport the coolie, for the first time in his life, probably, does no work, and has not a care, is clean, and has all the food and tea he wishes. He has no opium and no Chinese spirits. The change in the coolie is marvelous; he straightens and squares his shoulders, the wrinkles of worry disappear, and he simply exudes contentment. The shipping of the coolies is a slow process, is each must be re-examined by the doctors on the day of embarkation, and about 400 per day as the limit.

No Room for Misunderstanding.—The day before shipping, the coolies are taken in lots of 10 to the office of the Chinese Protector for a final examination in the catechism of what they are about to contract for. The questions asked are many and cover every possible point on which could hang a misunderstanding. Following are some of the questions:—

Where are you going? How long will you be at sea? What will happen when you arrive at the Transvaal? At what will you work? Can you work as carpenters, machinists, etc.? At what wages? Can you leave money in China for your family? How much? How many hrs. will you work a day? How many days per week? etc. Do you go of your own free will?

These questions are propounded until all understand, when the coolies are thus addressed:—

"If there is any coolie here who regrets having come and does not wish to go to S. Africa let him come forward. Any of you are at perfect liberty to go home now if you choose. There is no punishment and no money for you to pay if you have changed your minds. You have only to tell me and you may walk out of the compound and go home. The only requirement is that you leave Chinwangtao within 24 hrs."

Only about one in 200 coolies leaves at this point, and any excuse he may give is accepted by the Chinese protector.

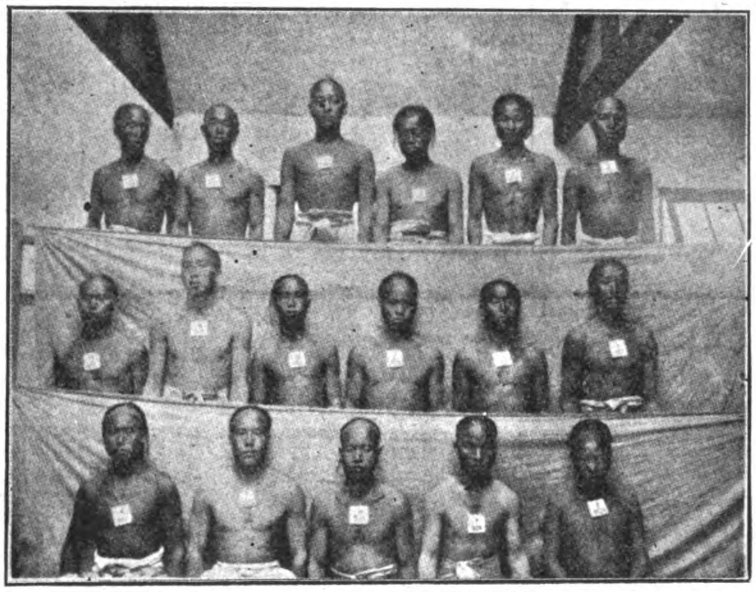
The next day is the final medical examination and shipment. In a large hall stand or squat some 200 coolies in rows along the wall. Their only clothing is a piece of string and a paper tag. In the next room are the doctors and the Chinese clerks. The coolies enter one by one. They are compared with their identification card. If passed they cross the room to a Chinese clerk who checks their name on the roll. They are then passed into the next room and into the tank through which warm water flows constantly. Here they leave behind all remnants of Chinese dust, and passing into the dressing room, put on new clean clothes, shoes, belts, socks, straw hats, etc., and reappear in dark-blue uniforms, no longer mere Chinese, but wearing on the front of the coat in Chinese characters the legend "Nan Fei Li Kung."

Tagged, Washed and Paid.—In the next room are three desks with Chinese clerks and a foreign supervisor. At the first the paper tag is changed for a lead disc with a number on it. This is fastened about his neck, and he is sent to the desk at which he arranges for a portion of his wages to be paid in China each mo., to his wife, father, or other person designated by him. This is done by means of a coupon pass book. Next he goes to that most interesting desk of all, the paymaster's. Here he receives $38 (Mexican), 2 mos.' pay, and $8 bonus. The majority never owned a silver dollar before. The money is laid out and counted in front of him. It is then pushed into a small tin pan, which will later serve him as a rice bowl, and he is passed to the next room, where he signs his contract, before which, however, he has one more chance to retreat if he so wishes. No one has ever retreated at this point.

The next room is a long hall divided lengthwise by an iron grating. On the one side the hall opens into the outside world; on the other into the compound. It is here that the S. African laborer bids farewell to his family and creditors. It is not a pathetic sight If his creditors leave him any of his newly acquired wealth his relatives argue with him for it, and fortunate the coolie who escapes to the next room with any money Here he receives his kit bag containing a full winter outfit of clothes, blankets, a tin cup, and everything he can possibly need on the trip, including a small bamboo pillow with folding legs to serve as a seat by day. They walk out with their bags on their backs, enter the train, and are taken at once to the dock, where they are changed to a waiting lighter and towed to the transport. Everything is clean and comfortable for them. Rules prescribe the number allowed on each transport, and they sail away with no work to do for a mo. and all they can eat. They are a most cheerful crew.

Results of the New Industry.—Following are the results of this new industry to the present. The first shipment of coolies was made from S. China in May, 1904. The total number of shipments from all ports to date is 29 The total number of coolies shipped from all parts of China is approximately 49,000. Of these 28,000 have been exported from Chinwangtao and 5,500 from Chefoo. The number of deaths during the voyage have been only three or four per trip. In reference to the mortality among the coolies after arrival in S. Africa, Mr. Ragsdale has been unable to procure exact data, as the records of the 15,500 shipped from S. China are not available in Tientsin. But from statements published in Johannesburg the health of the coolies has been eminently satisfactory, with the exception of those exported from the southern provinces. This difference was so marked that all exportation from the S. was soon stopped and only the strong rugged northerner is now taken. Of the 33,500 taken from the N. less than 300 have died from sickness. The total deaths have been 15.5 per thousand, of which 2.4 per thousand were due to accident. The number repatriated at the expense of the mines has been about 1,000, of which 204 were from the N. Less than 50 have returned to China at their own expense. Of the total number of coolies sent to Chinwangtao those rejected by the doctors after examination have amounted to about 30 per cent, thus showing great care used in final selection and to some extent the lack of care in the collecting.

There is one important omission in the Transvaal labor ordinance. It allows only the importation of unskilled labor for manual work in the mines. There is no provision for importation of the necessary Chinese clerks, secretaries, and interpreters. It is impossible to obtain sufficient Chinese-speaking Englishmen to perform the necessary work in Chinese involved in the importation of a large number of coolies into an English-speaking country. The few who speak Chinese fluently and are suitable for the work receive good pay in China, and the lower class of Chinese-speaking whites are in no way suitable for the work, as they are usually unreliable and the creators of everything but harmony. English-speaking Chinese are in every way preferable, as they thoroughly understand their own people, and with the exercise of ordinary care inthe selection, they are reliable, trustworthy, and nondisturbing workers

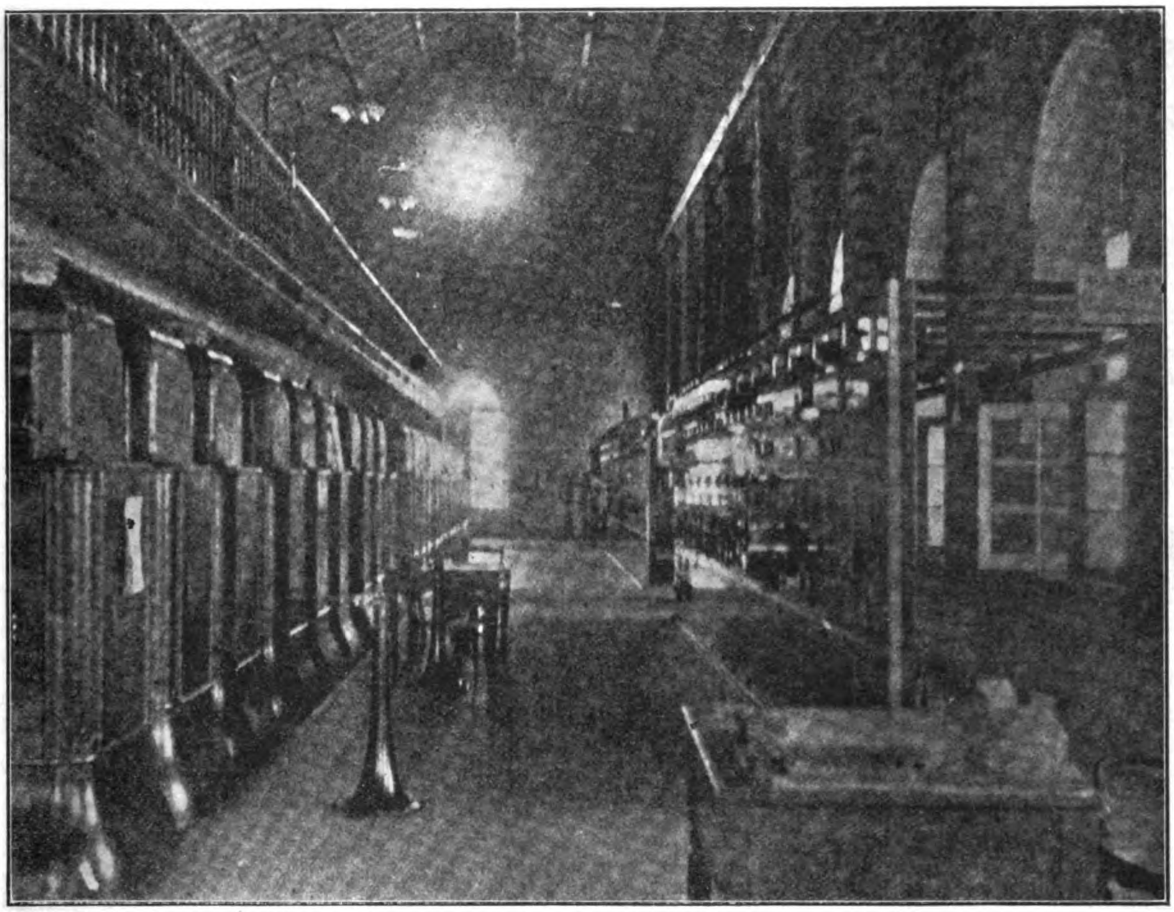


ACCEPTED FOR THE TRANSVAAL

LARGEST HYDROELECTRIC INSTALLATION IN SOUTHERN ASIA, MYSORE PROVINCE, ASIA.---II

(By A. C. HOBBLE.)

The three exticer units are 4-pole, 75-kw. machines, operating at 465 r. p. m., and over-compound from 110 to 115 volts at no load and full load respectively. With a power-factor of 95 per cent one exciter is capable of supplying the necessary generator field excitation with a station load of 5,500 kws. Since the ultimate total output of the plant is between 6,500 and 7,000 kws. it will be necessary to operate two exciters in multiple. The third exciter unit is a reserve, being operated, however, during the night for station lights. All wiring and cables leading from the generators and exciter units through the long stone cable duct to the transformer station on top of the bluff are lead-covered.



INTERIOR OF TRANSFORMER STATION AT SIVASAMUDRAM, SHOWING LOW-TENSION SWITCHBOARD AND POWER TRANSFORMERS

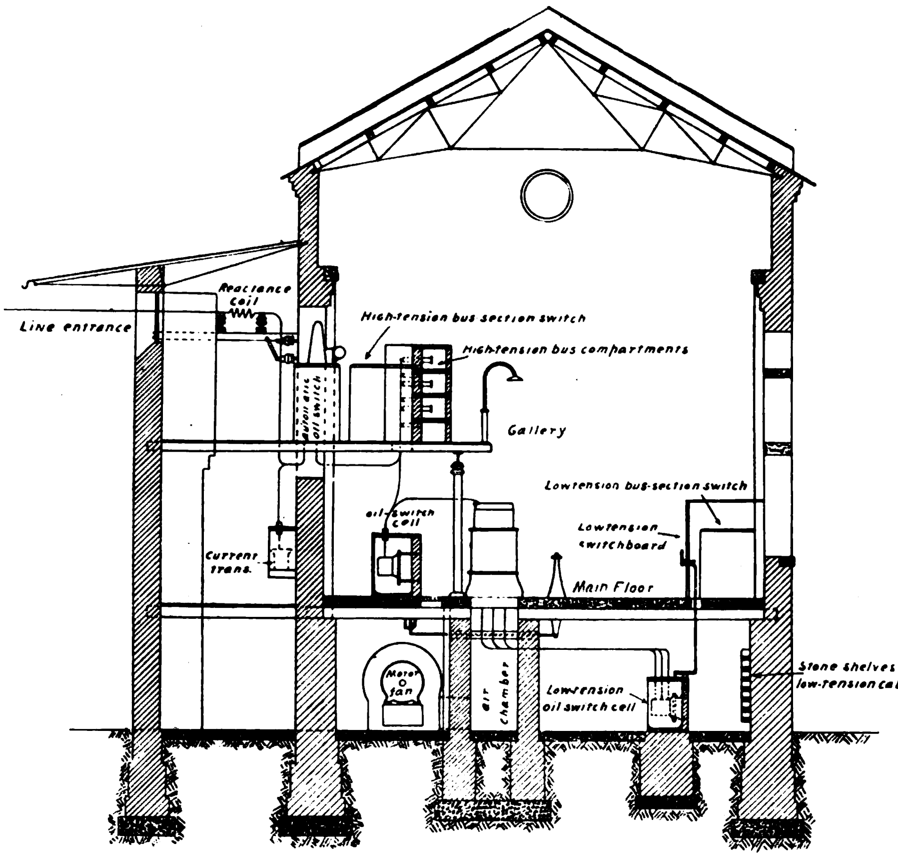
STEP-UP TRANSFORMER STATION AND EQUIPMENT.—It is due to the fact that the generating plant is situated in a very veferous locality that it was decided to locate the transformer station on top of the bluff (400′ above the generating station), thus making it more habitable for the switchboard attendants. Hence, all the essential switching and controlling apparatus is located in the transformer station, 1,000′ distant from the powerhouse. The generator voltage, varying between 2,000 and 2,250, according to the load, is raised to approximately 35,000 volts through seven banks of 350-kw. General Electric air-blast transformers. The transmission voltage was formerly 30,000, but during the second installation and owing to increase of power to be transmitted the line pressure was raised to 35,000 volts by replacing the 30,000-volt coils with new ones wound for the higher voltage. In this way and through other means to be described herein, the line loss has been kept at a reasonable value.

SWITCHING ARRANGEMENT.—The low-tension switchboard, consisting of 11 generator, two direct-current exciter, seven transformer bank, two total output, two line switch control, two voltage regulator, and five local panels of blue Vermont marble, is situated on the main floor, or second deck of the 3-deck arrangement. The 2,200-volt oil switches, bus-bars and disconnecting switches are located on the ground floor, while all of the high-tension switching apparatus, with exception of transformer oil switches, is located on the third floor or gallery. In addition to the usual voltage, power and current meters on the low-current switchboard are also two frequency meters, two synchronizing instruments and one power-factor meter. The synchronizing arrangement for both generators and the two sections of the 2,200-volt buses is an interesting study. This latter feature is one to which particular attention is called. The plant may be operated as a whole or in two separate plants, as desired. Repairs may be made with facility without disturbing the general operation of the plant. Many prominent engineers consider desirable, as a means of increasing reliability and continuity of service and the factor of safety against complete shutdowns of plant, the operation of the same as two entirely separate plants. Provided the power plant is being operated in this way, it is easy to unite the two sections quickly as one by synchronizing the low-tension buses at the generating end of the transmission lines. This is made possible by the quick-acting, 2,200-volt, motor-operated oil switch located between the two sets of low-tension buses.

On starting up the plant after a complete shutdown due to any cause, much time and trouble is saved by synchronizing all of the generators at the same time. This is accomplished by closing the mains and field switches of all of the generators and then closing the main exciter field switch, taking care beforehand to have all rheostatic resistance *cut in* in both generator-field and exciter-field circuits. The voltage is gradually brought to normal by turning out resistance from the exciter-field circuits. To assist the hydraulic operator in the generating station in holding the correct speed for paralleling alternators a synchronizing lamp is located on each generating panel. The switchboard attendant in the transformer station above throws the machines in parallel at the proper moment indicated by the pointer on the synchronizing instrument.

HIGH-TENSION SWITCHBOARD.—The old high-tension switchboard is composed of six double-line switch panels, and one panel upon which is mounted a 3-phase electrostatic ground detector. All are of blue Vermont marble, supported by a heavy wooden framework, allowing 3′ to each phase. On the new high-tension side of the transformer station a cheap construction is employed, using brick compartments for the complete enclosure of the three high-tension bus-bars and for separating the air-brake knife-switches which are connected in series with the 35,000-volt, single-pole, double-break transformer oil-switches. All of the high-tension transformer oil-switches are located in brick compartments on the main floor. All of the oil-switches in use have given entire satisfaction and those which have had 3 yrs. continued service have received no renewal of oil. A particular feature to be commended in the recent extension of the original installation is the location of high-tension and low-tension controlling switches within the immediate reach of the switchboard attendant.

In each transmission line at the generating end is an automatic motor-operated, 35,000-volt, double-break oil-switch. These are ad-



CROSS-SECTION SHOWING GENERAL ARRANGEMENT OF APPARATUS AND SWITCH COMPARTMENTS IN TRANSMITTING AND RECEIVING TRANSFORMER STATION

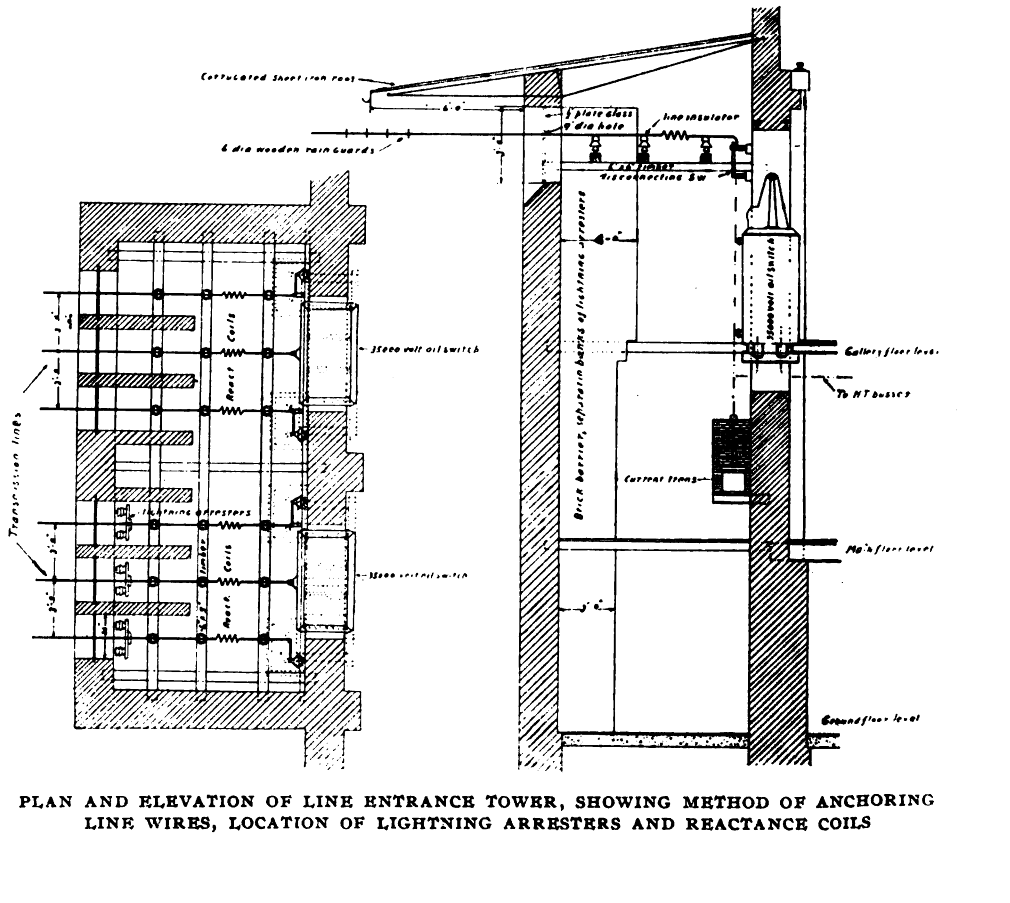
justed to trip at slightly over 100 per cent overload current by the action of an automatic bellows-type, time-limit relay. The time-limit mechanism of the latter is very simple and effective. The relay plunger, which is also the iron core of the solenoid, is actuated against air pressure by the line current. The time limit depends upon the strength of line current or overload, and the adjustment of the valve which controls the escapement of air from the receiver. With the electrically-operated oil-switches, with time-limit relays, the switching arrangement, supplemented by the use of time-limit bus-action switches at the Kolar gold field transformer station, a heavy overload or a short-circuit on one of the duplicate transmission lines actuates the time-limit relay oil-switch in the faulty line, thus switching it out of service, while the station output is carried on the other line until the fault is located. This is accomplished by the aid of a 350-kw. line-testing transformer, which will be more fully described later on. All the motor-operated oil switches are actuated by remote control switches, located on the line-control switch-panels of the low-tension switchboard.

"GENERAL ELECTRIC" VOLTAGE REGULATORS.—Another, a new and valuable feature adopted in the extension to the original plant, is the use of two "General Electric" voltage regulators. Owing to the wide range of voltage to be controlled—93 volts at no load to possibly 115 volts at full load—it was found necessary to operate the two regulators in multiple; one being adjusted to the low-voltage range, the other for the higher voltage. As the load gets beyond the limit of voltage control of one regulator, the other is immediately switched into service. An increase of load tends to lower the voltage and increase the line loss. The direct-current control magnet excited from the direct-current fuses and the alternating-current magnet excited from the 2,200-volt bus-bars, acting in conjunction, tend to maintain a constant voltage at the transmitting station. This, however, is not sufficient; since, owing to a variable line loss, the desired constant voltage at the receiving station, 92 ms. distant, does not pertain. To overcome this difficulty a second winding, excited from the transmission line or high-tension buses through a current transformer inserted therein, compensates for line loss regardless of phase relation. To accomplish this it is necessary to have the requisite amount of rheostatic resistance in the shunt-field circuit of the exciters. The differential relay magnets perform the office of cutting in and out this resistance. This action depends upon the *make* and *break* of the circuit controlled by the direct and alternating-current magnets above mentioned, and through which their actuating current is obtained.

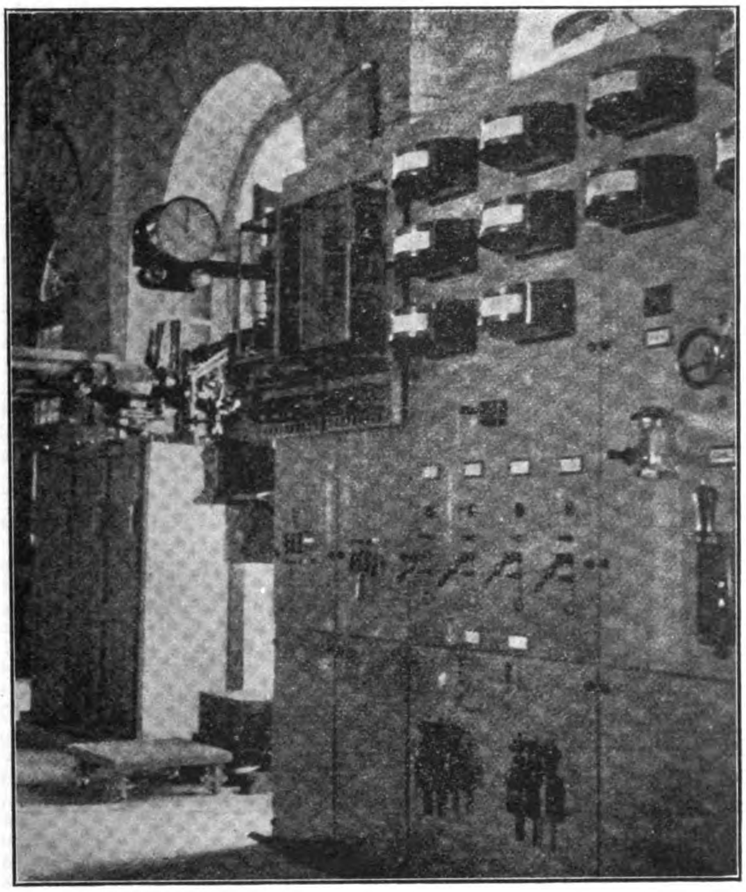
The regulator acts upon the slightest change of load and keeps the voltage constant at the distribution end of the line. Acting in conjunction with the waterwheel governors it performs a valuable service in preventing the line voltage from reaching a dangerous value when the entire station load at the receiving station is suddenly switched off for any reason. One, two or three exciters may be operated singly or in multiple on each voltage regulator.

The curves of line voltage and current from no load to full load operate at approximately power-factor 95 at the transmitting station with varying line loss conditions. Although the line voltage at the transmitting end varies approximately between 29,760 and 37,000 from no load to maximum, the voltage in the lower transformer station at Kolar remains practically constant at 29,702. Thus with both Kolar transmission lines in operation, the line loss varies from 702 volts at no load to approximately 6,000 volts at full load for power-factor 95, at the transmitting end of the line. This means a line loss of approximately 15 per cent at normal load.

WIRE TOWERS.—Separate wire towers are annexed to the main transformer building for outgoing transmission lines, lightning arresters, reactive coils, and line disconnecting switches. Outside of the towers, 15′ from the outer wall, is an additional pole structure for anchoring re-enforcements. This method of anchorage and entrance of the 35,000-volt transmission wires has proved effective and satisfactory in every way. There is no reason why this method should not prove as effective for 60,000 volts or even higher voltage. High velocity winds and violent driving rainstorms are prevalent in this country during monsoon weather; so that this method has been subjected to very severe tests. A feature not to be overlooked is the apparent abnormal roof extension and the relative position of the rain guards, consisting of 6″ flat wooden discs, with respect to the same More trouble has been experienced with the numerous low-extension distributing lines at Kolar than with the transmission lines during violent winds and rainstorms, as regards preventing the driving rain from entering the distribution towers.



PLAN AND ELEVATION OF LINE ENTRANCE TOWER, SHOWING METHOD OF ANCHORING LINE WIRES, LOCATION OF LIGHTNING ARRESTERS AND REACTANCE COILS



VIEW OF AUTOMATIC REGULATOR AND OIL-SWITCH CONTROL PANELS, 2,200-VOLT OIL-SWITCH IN BACKGROUND, LOW-TENSION SWITCHBOARD, SIVASAMUDRAM

Reactance coils have been inserted in each phase of the transmission lines between the banks of lightning arresters and the high-tension busbars. It has been a much-argued question among electrical engineers as to whether such coils are of real value as protective devices Experience, in general, has tended to show that they are a valuable adjunct to any electric transmission plant subjected to the effects of violent electrical storms. In this particular climate during a few mos. of the yr. violent electrical storms are of frequent occurrence. During 2½ yrs. of continued service without the use of reactance coils three transformers have been damaged by heavy lightning discharges. In each instance the discharge occurred inside the top of the transformer case from one of the high-tension leads to the iron case, a distance of from 4″ to 5.″ In each case the transformer winding served the purpose of a reactance coil. The lightning arresters were adjusted to discharge at a voltage not exceeding 10 per cent above that of the transmission voltage.

Naturally the simplest remedies suggested are additional transformer insulation and the insertion of properly designed reactance (often termed *choke*) coils between lightning arresters and transformers. Since the latter suggestion has been effected, we have experienced several severe electrical storms causing discharges to earth through the lightning arresters without disturbing the operation of the plant. At this time the arresters were adjusted to discharge about 25 per cent above normal line voltage. It is a good plan to keep a check upon the action of the lightning arresters by the insertion of *tell-tale* slips of paper or thin cards between the knobs of arresters nearest the earth connection. An idea of the severity of the discharge may also be gained in this way. A slight discharge will produce a series of tiny punctures in the card which are scarcely discernible with the unaided eye, while heavy discharge will produce a single large puncture in which the edge of the whole is charred. The reactance coils herein referred to consist of a simple helix of bare copper wire one size larger than the line wire. The coils are about 6″ in diameter, having 20 turns with ¼″ air insulation between them.

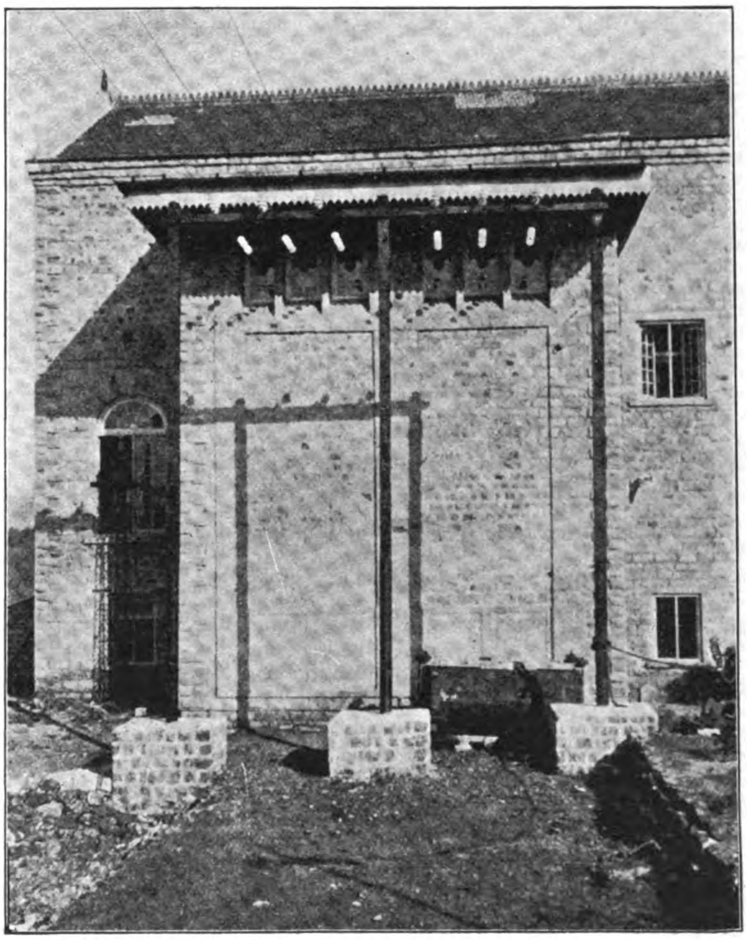
STATIC DISCHARGES.—It has been found that ordinary static discharges between brass cylinders of lightning arresters has produced a copper nitrate ($CuNO_3$) deposit in the air-gap between them to such an extent as to reduce the air-gap resistance several thousand *ohms*. This accumulation of copper salt occurs only between some six or eight of the brass cylinders located nearest the transmission wires. The deposit is probably due to the fixation of nitrogen from the air by the static discharge, and the presence of moisture with nitrogen peroxide (NO_2) results in the formation of HNO_3, the reaction of which in the presence of copper produces copper nitrate. Tinning the affected brass cylinders stops the reaction and solves the difficulty.

(To be continued.)

STEEL SCREW STEAMER "HSIN-KONG"

Messrs. S. C. Farnham, Boyd & Co., Ltd., of Shanghai, (recently reorganized under the name of the Shanghai Dock and Engineering Company, Ltd.), have completed, at their Pootung works, the steel screw steamer *Hsin-Kong*, built for the China Merchants Steam Navigation Company to the design and under the supervision of Mr. T. Weir, the company's marine superintendent. The hull is of steel, designed for the China Coast trade, and is of the following dimensions:—Length over all 280′, length between perpendiculars 270′, breadth moulded 40′, depth moulded to main deck 21′6″, height of bridge deck 7′3″, height of shade deck 7′, main to lower deck 7′, top gallant forecastle (length) 38′, bridge (length) 88′, poop deck (length) 42′. The vessel is schooner-rigged, having two steel pole masts with a complete set of fore and aft sails and awnings. Four ordinary cargo derricks and one heavy derrick capable of lifting four tons are also in the equipment. The ship is built to the British Corporation's highest class to meet the Hongkong Government survey and British Board of Trade requirements.

(Continued on page 292.)

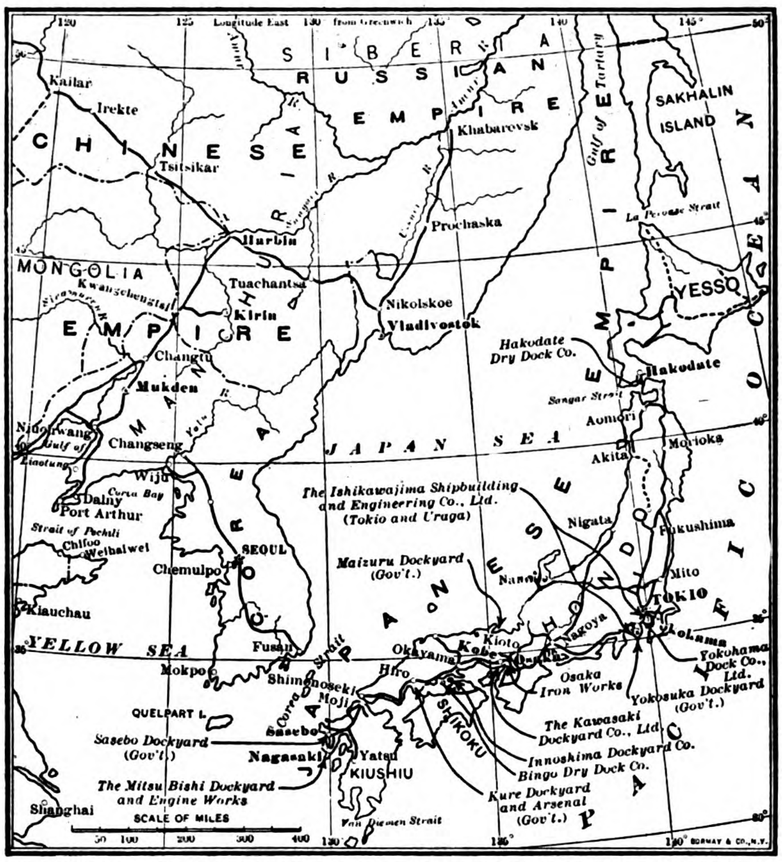


VIEW OF LIGHTNING ARREST TOWER AND OUTGOING TRANSMISSION LINES, TRANSFORMER HOUSE, SIVASAMUDRAM

EQUIPMENT AND CAPACITY OF THE DOCKYARDS AND SHIPBUILDING PLANTS OF JAPAN==II

(By CHAS. ALBERTON.)

In a previous paper, after a broad discussion of industrial conditions in Japan, the general shipbuilding statistics were given, and the government dockyards described. The present article takes up the private establishments for shipbuilding and repair work, and treats them in fuller detail.



JAPAN AND NEIGHBORING COUNTRIES, SHOWING PARTICULARLY LOCATION OF THE JAPANESE SHIPYARDS

Mitsu Bishi Dockyard and Engine Works.—These works are for the most part on the NW. shore of the Harbor of Nagasaki and opposite the City of Nagasaki. The pretty harbor averages about ½-m. wide, is something like 3 ms. long, and is located at the SW. extremity of Japan, which makes it a very convenient rendezvous and refitting station for all naval fleets in Far Eastern waters. The war vessels of ½-a-dozen different nations are often at anchor here at one time. Most of the Pacific, European, and other liners call at Nagasaki for coal, if for no other purpose.

In 1856 the *shogun* built a small engine works at Akunoura, importing Dutch machinery and Dutch engineers to take charge of the plant. Akunoura is on the E. end of the company's present premises and is today occupied by one of the best engine and boiler-building plants in all the Orient. The yards have a waterfront of 1½ ms., and the area occupied is about 80 acres. The original works, after serving the *shogun* government in doing repair work on very small vessels for about 10 yrs., came into the possession of the government of His Imperial Japanese Majesty, the present mikado, at which time they were greatly improved.

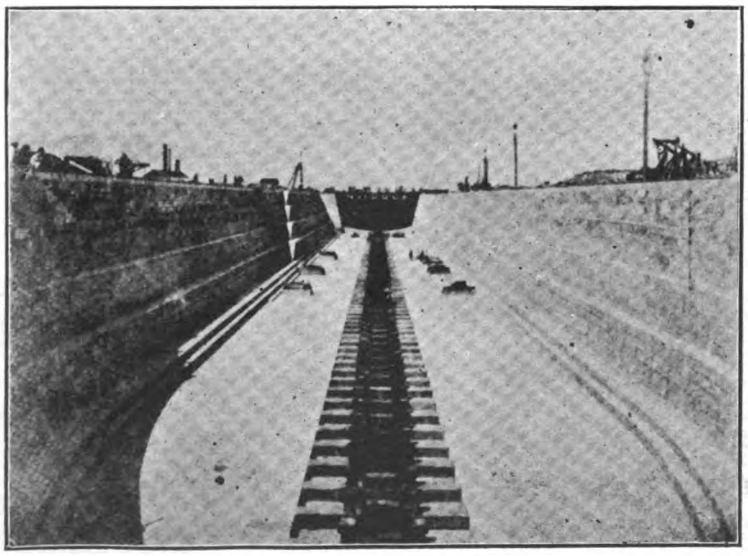
What is now the No. 1 drydock, since lengthened, was then built at Tategami, located at the W. end of the premises, and a patent slip at Kosuge, on the S. side of the harbor, owned by a British merchant, was purchased. In 1884 the entire plant was sold to Baron Y. Iwasaki and H. Iwasaki, who are the proprietors of the Mitsu Bishi Company, which, besides owning this great concern, controls other large industrial enterprises in Japan.

These shipbuilding and engine works are then the oldest in Japan. They have in use three drydocks and one patent marine slip. The big dock can accommodate the largest ironclads and merchant ships which now float the Pacific, and since these are as large as any in the world, the immense size of the new drydock is readily apparent. The company is prepared to undertake any kind of marine work whatsoever, including the heaviest, since it has lately installed the very largest and latest types of necessary machinery, has exceptional docking facilities, and is greatly extending the area covered by permanent buildings.

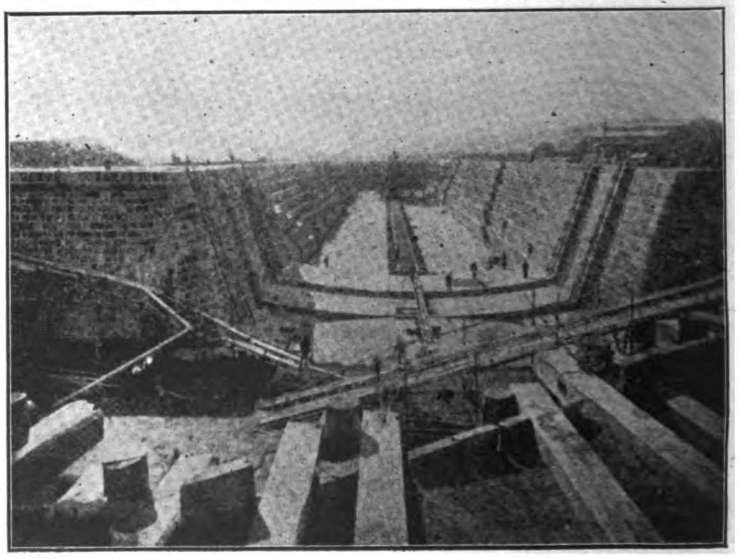
The tonnage of vessels launched from 1885 to 1894, inclusive, would scarcely average 250 tons per yr., although the company did a very large docking and repair business. Since then, however, the shipbuilding end of the business has rapidly increased and the works can now easily turn out 20,000 tons per yr. In 1895 about 2,500 tons were launched; 1898 about 8,000 tons; 1899 about 4,000 tons; 1900 about 11,300 tons; 1901 about 7,200 tons; 1902 about 15,875 tons; and 1903 about 13,100 tons. From 1885 to 1897, inclusive, the i. h. p. of engines built in the shops would not average more than 600 yearly. Since then, up to 1903, the yearly h. p. follows:—In 1898, 4,225 h. p.; 1899, 3,200 h. p.; 1900, 13,500 h. p.; 1901, 6,240 h. p.; 1902, 13,340 h. p.; 1903, 11,463 h. p.

There are on the office and yard staff about 50 men, including six foreigners. The total number of workmen employed from 1884 to 1893 started at 766 and ran up to 1,200. At the end of 1897 the number had increased to 3,800, and then remained stationary until the end of 1900. At the end of 1903 there were 5,658 men on the payroll. These figures show very decidedly the increase in capacity and business since about the time of the war with China.

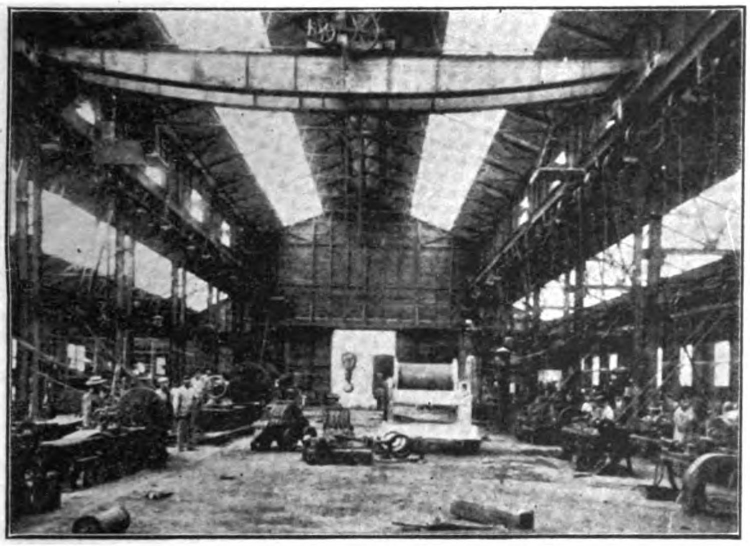
In 1898 the first 6,000-ton steamer was launched, since which time this yard has built six others just as large, six of about 2,500 tons,



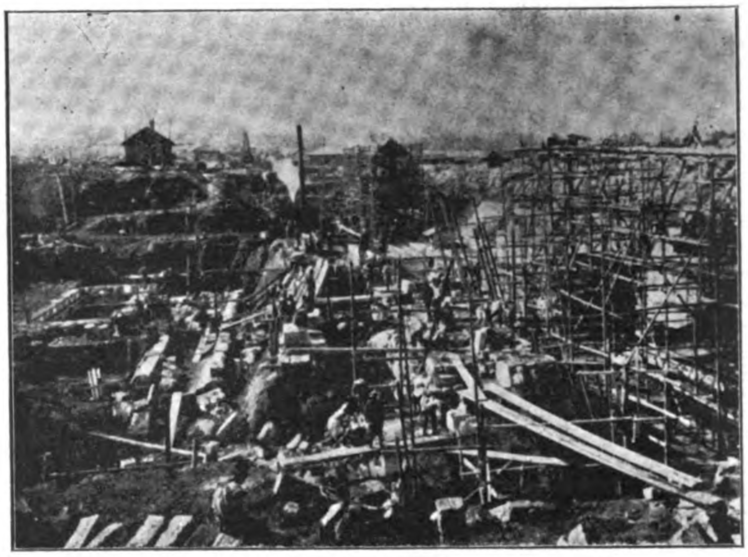
GRAVING DOCK OF THE KAWASAKI DOCKYARD COMPANY, LTD., LENGTH 426′, WIDTH AT TOP 64′, DEPTH 24′



LARGE DOCK OF THE YOKOHAMA DOCK COMPANY, LTD., COMPLETED IN 1899



MACHINE AND FITTING SHOP OF THE YOKOHAMA DOCK COMPANY, LTD., SHOWING HAULING WINCH FOR SLIPWAY



NO. 2 DOCK AND PUMP HOUSE OF THE YOKOHAMA DOCK COMPANY, LTD., IN COURSE OF CONSTRUCTION, 1896

six of about 1,600 tons, besides a half-dozen smaller ones. They have built for the Imperial Japanese Navy one 120-ton torpedoboat and two each of 80 tons, the government furnishing the materials. They have also constructed two dredges of 500 gross tons each for the Wakamatsu harborworks, and a large number of small craft of various types from 100 to 300 tons. The company is proud of the twin-screw steamship *Aki-maru*, of 6,443 gross tons and 5,448 i. h. p., now belonging to the Nippon Yusen Kaisha and ordinarily in service on the American line running to Seattle; also the little steam yacht *Hatsukaze* of 80 tons gross and 200 i. h. p., built for the use of the crown prince and launched in 1902. Japanese art has figured largely in the trimmings and furnishings of these ships and the result is unique as well as highly satisfactory.

The dimensions of the three drydocks, all of which are faced with granite and built in solid rock, are as follows:—

	Length on keel blocks	Top entrance width	Bottom entrance width	Depth of water on blocks at spring tide
No. 1 Dock	510′	89′	77′	26′6″
No. 2 Dock	350′	66′	53′	24′
No. 3 Dock	714′	96′7″	88′7″	34′6″

The patent marine slip owned by the company has a length of rail of 750′, width between rails of 30′, and it is capable of taking vessels weighing up to 1,000 tons.

The company is prepared to undertake extensive salvage operations, having built especially for this purpose the steamer *Oura-maru* which is 186′ long, 29′ beam, 16′ depth, and 712 tons gross. She is fitted with four centrifugal pumps, three pulsometers, and one special pump, is capable of handling 2,000 tons of water per hr., and is equipped with a large electric-lighting plant so that salvage operations may be carried on both night and day.

In order to obtain enough satisfactory men, the company conducts a school which has been in operation for 5 yrs. This school is carried on in a handsome 2-story brick building built for this especial purpose. They teach five classes of boys, in all about 250. About 50 boys enter each yr., besides 100 apprentices who are given lessons in the morning before going to work. In March, 1904, 22 boys graduated and entered the different departments as apprentices for a term of 5 yrs. As showing the attitude of large works to the outside public, it is interesting to note that **this school is free to any one who cares** to enter.

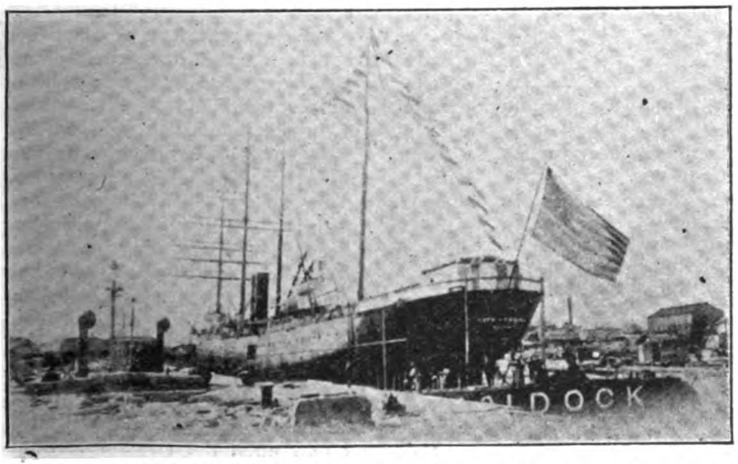
The company has built a hospital where it maintains a corps of physicians to treat the employees of the company free of expense. It has accommodations for 50 patients at one time.

The company also owns its own water supply. That it is liberal in the treatment of its employees is shown by the further fact that since 1897 it has had in operation a combined pension and insurance system. To this fund each employee makes a monthly payment, while the owners contribute an equal amount. The benefits range from -Y-50 to -Y-2,500, according to the standing or position of the employee, and are given to the families of those who are either injured or die at the works. Those who retire from old age receive a pension. A savings bank system is also in operation. Each employee who so desires deposits -Y-1 on each payday, on which the company pays a liberal rate of interest. When the principal and interest reach -Y-300 the company then adds -Y-50 to the amount and another account is opened.

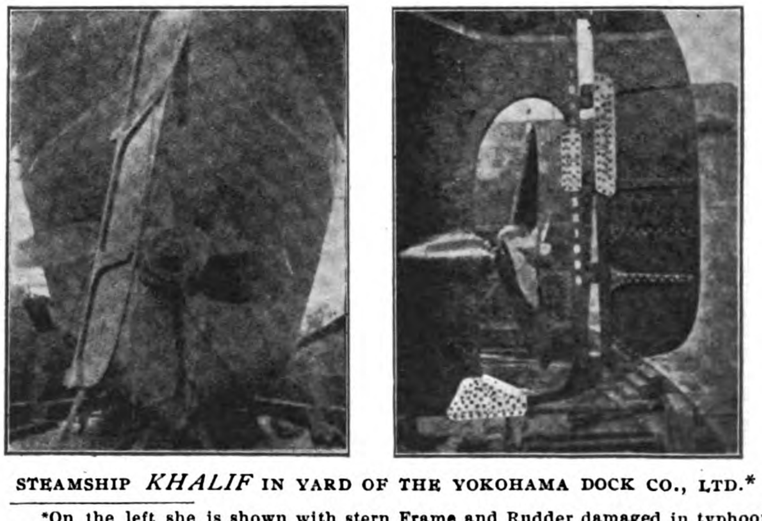
On the premises the company has erected a clubhouse for the use of its officials and foremen. It is fitted with billiard tables and various games. Lunch and light refreshments are served at any time. The reading room is supplied with reading matter consisting mostly of engineering and naval works, text books, and current technical journals. Upon the beautiful hillsides back of the works and overlooking the harbor there are about 20 official residences for such of the high-class employees as care to occupy them. It will thus be seen that this company takes an interest in about everything that pertains to the welfare of its workmen.

KAWASAKI DOCKYARD COMPANY, LTD.—This company has extensive grounds and a lengthy waterfront on the W. side of Kobé Harbor. The City of Kobé is located near the entrance of the celebrated Inland Sea of Japan, on the NW. shore of Osaka Bay, and only a little S. of the center of Japan's E. coastline.

As showing the type of men who are now entering shipbuilding and other industrial works in Japan, it is worthy of mention here to note that the president of the company, Mr. K. Matsukata, is a son of Count Matsukata, the father of Japan's present financial system and who is a trusted adviser of the emperor. To find a man of this type engaged in business

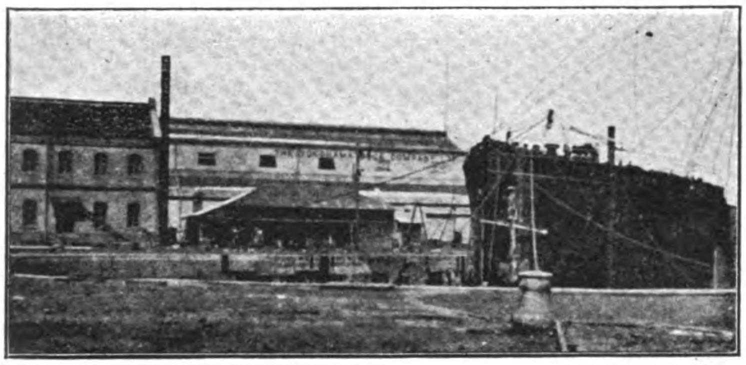


STEAMSHIP *CITY OF PEKIN* IN LARGE DOCK OF THE KAWASAKI DOCKYARD COMPANY, LTD.

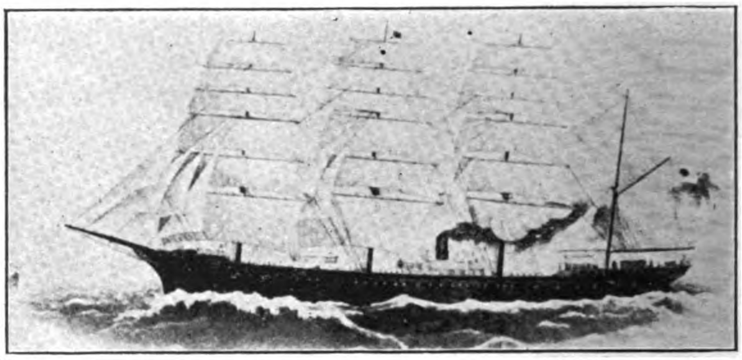


STEAMSHIP *KHALIF* IN YARD OF THE YOKOHAMA DOCK CO., LTD.*

*On the left she is shown with stern Frame and Rudder damaged in typhoon, and on the right, with temporary repairs, with which she steamed full speed to Cardiff, Wales.



PART OF THE YARD OF THE YOKOHAMA DOCK COMPANY, LTD., SHOWING BOW OF VESSEL IN THE BIG GRAVING DOCK



TRAINING SHIP *TAISEI-MARU*, BUILT BY THE KAWASAKI DOCKYARD COMPANY, LTD., USED BY NAUTICAL SCHOOL OF TOKYO

enterprise only goes to show the immense change that has taken place on Japan within the last 40 yrs. Previous to that time the better class Japanese would have nothing to do with business and the merchants were not looked upon with favor. At the present time the change is complete and business is an honorable profession with men of all rank. The coming of the higher class Japanese into business has brought in the much-needed higher ideals as to commercial methods and honesty.

In order to keep posted on the best designs, tools, and manner of working in Europe and America, the officials of this company send every yr. in regular rotation one of their engineers to study what is being done. Besides this the management occasionally sends some of the executive members to study up this side of the business. The company is a thorough believer in the ability of the Japanese to do things and hence does not employ foreigners in any capacity. Like all the other large drydock companies, it buys only the best material, and the management and engineers insist on turning out good work.

While Kobé is not the home port of any large steamship lines, all the steamers, both from Europe and America, including cargo and passenger steamers, make Kobé a port of call. This port has therefore the largest tonnage of any harbor in Japan, and naturally the shipping interests are very large. This makes an ideal location for dockyard companies.

The Kawasaki Dockyard Company, Ltd., is the largest in operation in Kobé at the present time, next to the largest in Japan, and is engaged in shipbuilding, repairing and general engineering work. The Japanese Government, being paternal in its rule, early started to establish various industries, and shipbuilding was one of those thus helped. As these industries developed and no longer needed governmental care, they were turned over to private companies to operate, and so it came about that this establishment was sold to Mr. Shozo Kawasaki some time in 1886, after having been started by the government in a small way during the '70s. In 1896 the present stock company was organized, taking over the whole works and capitalizing them at -Y-2,000,000, which was fully paid up. Since then the company has issued, mostly taken by the original stockholders, another -Y-2,000,000, of which only part has been taken up. Although nominally a registered company, it is practically a close corporation, since the majority of the stock is held by a few influential men. The company regularly pays a dividend of 12 per cent on the stock, and has issued bonds at two different times, each issue being -Y-1,000,000, bearing 9 per cent and 7 per cent interest.

The company has nine shipbuilding berths and the necessary machinery for laying down and building vessels of various lengths up to 600′ and 7,000 tons gross. It also has a splendid drydock, described below, and two patent slips, the larger of which is 600′ long on the rail and will take vessels up to 280′ long and about 2,000 tons gross, while the smaller one is 400′ long on the rail and will take vessels up to 180′ in length. The present and proposed buildings, of which there is an ample number for all purposes, are some of them large size, and all the buildings now being erected are either of brick or skeleton steel framework with galvanized roofing and sides. They are being located and arranged so that they can readily be extended as the business increases.

Outside of its regular shipbuilding, docking, and repair work, the company has made boilers of various sizes and types, including eight Miyabara watertube boilers for H. I. J. M.'s cruiser *Hashidate*, marine and land engines, direct-connected centrifugal pumps, engines, tanks, steel pipe, etc. It also has in operation a special department for the manufacture of shells for the small guns of the imperial defense. It has a good-sized salvage steamer built by itself, fitted with powerful electrically-driven pumps, driving apparatus, derricks, and all other necessary gear. On the grounds is a small dispensary fitted with first-aid appliances, while a regular physician is always within call.

The management is very progressive, and the company was the first in Japan to build vessels for export. It points with pride to the pioneer export ship, the steamer *Liu Hsing*, a lighthouse and buoy tender, built and engined complete for the Imperial Chinese Maritime Customs at Shanghai. This vessel is fitted with twin screws, triple-expansion engines of 1,300 i. h. p., electric light, and all other modern appliances. The gross tonnage is 750 and the speed 13 knots. She is 185′ long, and was completed in June, 1902. The Kawasaki company has also built a small river gunboat for the Chinese Government, a lighthouse tender which will carry a couple of light guns for the Korean Government, and a steam launch for the Siamese Government.

The growth of the works will be shown from the fact that in 1898 the tonnage of the ships launched was about 1,000, having engines of 1,200 i. h. p., while there were employed at the works about 1,800 men. In 1902, 8,500 tons were launched, with engines of 11,000 i. h. p., and the number of employees was about 3,500 In all the company has built about 50 vessels, the largest to date being about 2,300 tons gross.

The power used throughout the works is entirely electrical. The large machines throughout the works are run by individual motors, while the small ones are run in groups. The management has decided to install an 800-kw. steam turbine unit. The company has also in use what is probably the most expensive pneumatic outfit in the empire. This plant and the various tools were imported from America, where the management sent an engineer to be thoroughly instructed in their use.

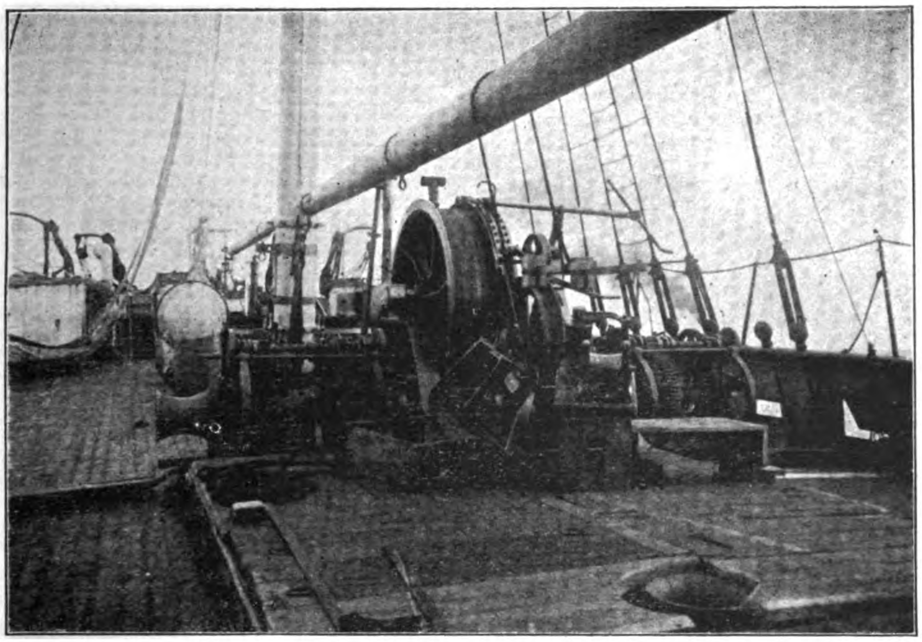
The company also has a very powerful hydraulic plant for flanging, joggling, and forging, which was imported from England. This was the first dockyard in the empire to install a cast-steel plant, and for some time past it has been using cast-steel wherever necessity called for light weight combined with strength, such as frames for engine in torpedoboats, and has had very good success in this line of work.

The shipping conditions in Kobé Harbor began to demand a drydock in the early '90s. The Kawasaki dockyard people therefore prepared to meet this demand, and upon making an examination of the strata underlying their property, found that they would have a very difficult piece of engineering work in order to successfully build a drydock. Test borings showed that under the top layer of sand there was a layer of silt some 25′ thick, beneath which were other layers, mostly sand, all evenly charged with water and evidently connected with the sea. The opinion was freely expressed among the foreign engineers living in the vicinity that the dock could never be built at the site selected. The dock was however officially opened in June, 1902, having been about 5½ yrs. in building. Since then it has been occupied almost continually and remains as when built as tight as a drum and as dry as a bone.

The dock complete with pumping outfit cost about $850,000. The American, German, Austrian, British and other governments have had their war vessels in this dock, which is also patronized by all the European, Australian, American and Japanese steamship lines whose vessels call at Kobé. Its dimensions are as follows:——Length, caisson to toe of head wall, 426′; length on floor, 392′; width of entrance at top, 64′; width of entrance at bottom, 52′; depth of sill below high water, spring tide, 24′.

As illustrative of the manner in which the Japanese Government makes use of the industries in the empire which may be of assistance to it, the following is of interest:—All the larger warships of the Imperial Japanese Navy have been imported, principally from England, and until lately most of the smaller vessels were also built abroad. Torpedoboats and torpedoboat destroyers were often sent for repairs to the larger and best equipped of the private dockyard companies, which in this manner became more or less familiar with the construction of these little fighting craft. Later on torpedoboats and torpedoboat destroyers were ordered from abroad, but were shipped knocked down to Japan, and sent with the erecting drawings to the few of the private dockyard companies, including the Kawasaki, for erection. The companies thus had the benefit of the experience obtained; first in repairing, second in erecting the small vessels, and the third and final step was the building of these little craft themselves. These two or three of the dockyards are now doing and some of the vessels so built saw service during the recent war with Russia. By this method Japan is gradually absorbing the knowledge of other nations and taking into her own hands work of all kinds as fast as she is able to equip herself to undertake it.

YOKOHAMA DOCK COMPANY, LTD.—Yokohama is situated upon the W. shore of Tokyo Bay and in order to protect its shipping the government has made a good harbor by building an extensive breakwater. Within this breakwater and upon the city's shorefront, is located the property of the Yokohama Dock Company, Ltd., which is therefore accessible in all kinds of weather.



CABLE-LAYING DRUM MADE AND FITTED TO THREE STEAMERS BY THE YOKOHAMA DOCK COMPANY, LTD.

Before there were any graving docks in Yokohama, the old Mitsu Bishi Steamship Company owned a small repair works there. When the Mitsu Bishi Company was absorbed by the Nippon Yusen Kaisha, in 1885, the latter of course took over the repair works, but desiring to confine its attention to its growing shipping business only, it sold the repair works to the Yokohama Dock Company, Ltd., in 1896. This yard differs from some of the others in Japan in that it was not started, and has not been assisted by the government.

Although this company is engaged largely in doing repair work, yet it builds small towing boats, yachts and launches, lighters, land and marine boilers and engines, steel frame buildings, etc. In 1903 the company erected steel framework amounting to 400 tons, and generally finds this class of work profitable. In 1904 there were on the premises 19 buildings and 11 sheds, 11 of which were brick, one steel frame, and the rest stone.

Yokohama is either the terminus or home port of almost all of the many lines running from Europe and Australia *via* S. Asia to China and Japan. It is also the beginning and end of all the great Nippon Yusen Kaisha's schedules, with the exception of the American line. All the big and little Transpacific steamers call at Yokohama as well, so it was an excellent location for much-needed docks.

The present company started operations in 1896. Its small dock was opened in 1897 and the large dock in 1899. The works were started with the idea of docking and doing repairs only and this has been largely continued to the present time. They are the result of a desire, on the part of some of the shareholders of the Nippon Yusen Kaisha and of some influential Yokohama men, to have ample facilities for docking vessels at Yokohama. Previous to the opening of these docks the most available place for repairs in this neighborhood was at the government docks at Yokosuka, but these were available only by obtaining special permission and in case of extreme necessity.

The area of the works is 37,624 *tsubo*, or 1,354,464 sq. ft. The waterfront has a length of 3,104′. In the dredged passage or basin in front of the docks there is a depth of 36′ at high water, but in the harbor outside the basin it is not so deep, although this is now being deepened. The larger part of these works was built on reclaimed land with the understanding that the property was to belong to the company when the reclaiming was properly done.

In all the company has on the payroll about 1,000 employees, of which a fair number are apprentice boys. Usually the different grades of men are trained in the works, although occasionally some are obtained from the smaller yards with which Japan abounds. Probably 15 per cent of the present help has come from other works, and a less proportion than this drifts away either to start in business for themselves or to work in other shops. At this yard, as in all Japanese yards, it is difficult to secure in a hurry any exceptionally large increase in employees, although a floating number up to 15 per cent of the present number is usually readily secured.

Here, as elsewhere, there are no regularly organized labor unions, but the old time customs, which are very powerful and sometimes deeply felt, have to be regarded very carefully. Ordinarily, however, the workmen are fairly just in their requests and are not troublesome. They feel that they belong to the company and to its officers. In fact one might almost say that they feel that a part of the company belongs to them. Really they seem to take pride in being part of the works, which increases with the length of their service, and this feeling is not without reason, because the men are kindly treated and seldom discharged even when work gets scarce. When once discharged there is difficulty in getting them back again. Here, as everywhere and in every condition in Japan, the old feeling of master and servant still remains to an extent so much greater than in America, that it is hardly appreciable by Americans.

The men show an adaptability in changing from one kind of work to another, otherwise on repair work the company would not be so successful. Those, however, who work on machine tools are kept there permanently. It is the established policy of the company to substitute labor-saving machines for hand work wherever possible, since it considers these both quicker and cheaper than the best labor obtainable, the price of which is rapidly rising.

A floating derrick of 35-tons capacity is in use along the waterfront, while a system of light railway facilitates transportation of materials among the buildings. A branch of the Imperial Government Railways runs into the yards and is connected with a system of tracks reaching all the main buildings. The buildings thus reached are served by a 6-ton traveling crane.

A wet dock without gates is now in process of construction for enabling deep-draft vessels to be moored at the works. This will be built on property now owned by the company and will be 500′ long, 160′ wide, and 30′ deep at low water, and will take about 2 yrs. to complete. The company has in operation two drydocks and one small marine slip, which is used mainly for tugs, launches, and other small craft. The larger drydock has an inside length of 514′, and the other, of 375′.

The largest vessels docked have been *Inaba-maru* and other European liners of the Nippon Yusen Kaisha, these being rated at abou,. 6,200 tons gross, and having a length of 449′t beam 49′9″, and depth 30′6″.

ISHIKAWAJIMA SHIPBUILDING AND ENGINEERING COMPANY, LTD.—This company has in Tokyo a wooden graving dock, and besides shipbuilding has a considerable trade outside the regular marine line of work. It has never built any large ships, but all told has launched something like 125 vessels, mostly of wood. Thirteen thousand tons gross will cover the output. In 1902 the company amalgamated with the Uraga Dock Company, Ltd., and the combined works are now in position to build ships of large size. The Uraga property is near the entrance of Tokyo Bay and is conveniently located for the large ships making Yokohama or the smaller ones making Tokyo There are two docks at Uraga, one having a length of 497′ and a depth of 26′, and the other a length of 471′ and a depth of 24′6″.

Either dock can be emptied in 3 hrs. Warships belonging to the governments of the United States of America, Germany, and Austria have been docked and repaired here. These yards have several shipbuilding berths and all the necessary machinery for the building of large ships, besides the equipment necessary in the docking and repairing of ships.

OSAKA IRON WORKS.—These works are located near the mouth of the Aji Kawa (Aji River), which flows through Osaka and into Osaka Bay through the new Osaka harborworks. The business has been gradually increased until now the works occupy about 20 acres of land, with a waterfront of about 2,000′.

Up to the present time the yards have turned out about 200 ships, a little less than ⅔ of which are very small wooden ships, the balance being steel. In this number are included several light-draft steamers for freight and passenger service on the short and shallow Japanese rivers. Under the subsidy act and since 1900 the company has built, engined, and launched several steel steamships having a tonnage of 8,000 tons gross and 7,000 h. p.

There is one 250′ drydock in operation, two more are projected, and the company possesses the usual equipment for docking and shipbuilding, together with that required for such work as usually comes to an ironworks. At the present time it is impossible to turn out large vessels, since the river is only 14′ deep, but when the harborworks are completed and river will be dredged and the works will be equipped to build larger ships.

The company does a great deal of outside work, including castiron pipes for waterworks, bridge and steel framework, complete concrete-making plants, and bucket dredges for the rivers and harbors of Japan having a capacity of from 100 to 400 tons per hr.

HAKODATE DRYDOCK COMPANY.—This is the northernmost of the Japanese dock companies and is located at Hakodate on the S. shore of the Island of Hokkido. The works started first with a patent marine slip having rails 520′ long, and capable of lifting vessels up to 1,400 tons gross. With the increased shipping interests in that section these facilities were inadequate and the company has recently finished a new granite drydock 534′ long at the top, 82′ wide at the top, and 72′ wide at the bottom, with 30′ of water on the sill at spring tide. This is not a shipbuilding company. The equipment owned is sufficient for light repairs only.

INNOSHIMA DRYDOCK COMPANY.—This company builds wooden junks and does ordinary repair work on medium-sized steamers. It is located on an island near the center of the Inland Sea and has two drydocks cut from the solid rock. The larger dock is 357′ long on the bottom, 50′ wide at the top, and 44′ wide at the bottom, with 20′ of water on the sill at spring tide. The other dock is used for light-draft interisland trading vessels which are usually docked two at a time, and is 300′ long.

STEEL SCREW STEAMER "HSIN-KONG"

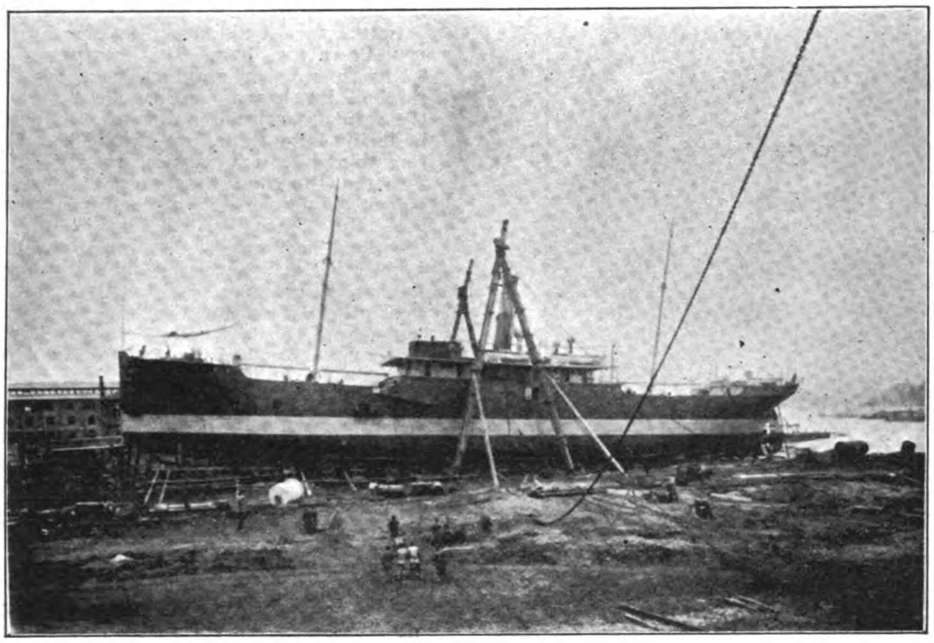
(Continued from page 287.)

GENERAL PLAN OF THE SHIP.—The vessel is divided into seven watertight compartments, comprising the machinery space which is amidships, three cargo holds, two water-ballast tanks, which are also arranged to carry cargo, and fore and aft peaks. The whole of the 'tween decks, before and abaft machinery, which extends the full width of the ship, is available for cargo, having four hatches with cargo stages in hold, eight cargo ports, and every facility for the rapid handling of cargo.

The main and lower decks are of steel throughout. The poop, bridge, and forecastle decks are sheathed with teak and the shade deck over bridge with Oregon pine, having teak covering boards enclosed by iron railing.

A bulwark 3′ high is carried up between top-gallant-forecastle and bridge, and between poop and bridge, in which are fitted eight cargo gangways. On the main deck three steam-whipping winches and one horizontal winch, by Messrs. Clarke, Chapman & Co., Ltd., are arranged alongside the four hatches, the latter being fitted for manœuvering the ship to wharves.

A powerful steam windlass and capstan combined, by the same makers, is fitted on the top-gallant-forecastle for working Hall's patent stockless anchors and the speedy manœuvering of the vessel, with appliances for rapid mooring. The forecastle is fitted up for the crew and firemen and the lower forecastle for the petty officers and stores.



STEAMER *HSIN-KONG* BEFORE THE LAUNCH

The accommodation in the bridge is arranged for 40 2d-class Chinese passengers, two berths in each room; chief compradore's room, two galleys, and scullery and water closets. The poop has 44 open berths for 3d class Chinese passengers.

Accommodation for 1st-class passengers is fitted on the bridge deck and consists of a saloon which is tastefully panelled in cedar pine with hardwood pilasters and painted white and gold, three staterooms, pantry, gallery, scullery, storeroom, bath and water closet; also rooms for the chief mate and the chief engineer forward, and for 2d mate, 2d and 3d engineers, mess room, bath and water closet, steward, steward's store and boys aft.

On the shade deck the captain's room and wheelhouse are fitted with four lifeboats. The dinghy and cutter are housed in the poop. A set of steam steering gear, by Messrs Caldwell & Co., Ltd., is fitted in the engine-room and operated from wheelhouse and flying bridge, and the screw steering gear, by Messrs. John Hastie & Co., Ltd., is fitted aft on the poop.

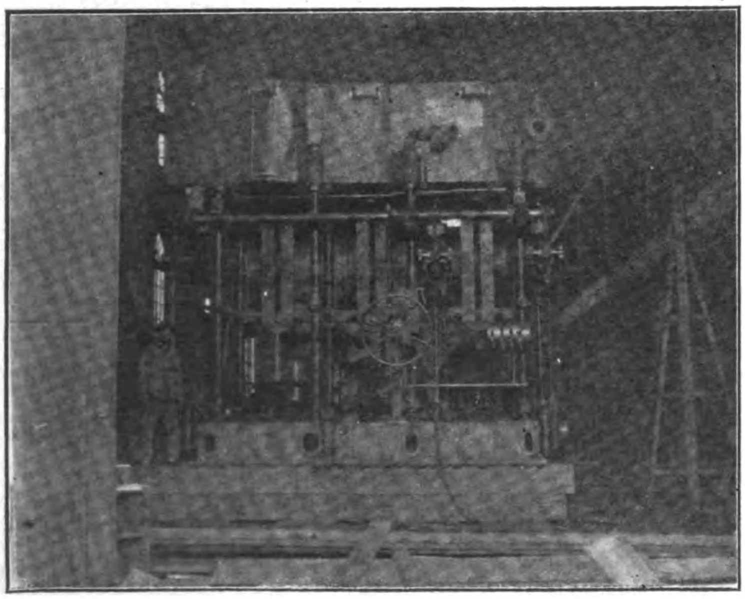
There is a complete installation of electric lights throughout the vessel on the double-wire return system, consisting of 162 lights, including masthead, side lights, and four cargo clusters. The dynamo and engine, by Messrs. Clarke, Chapman & Co., Ltd., is fitted in the engineroom.

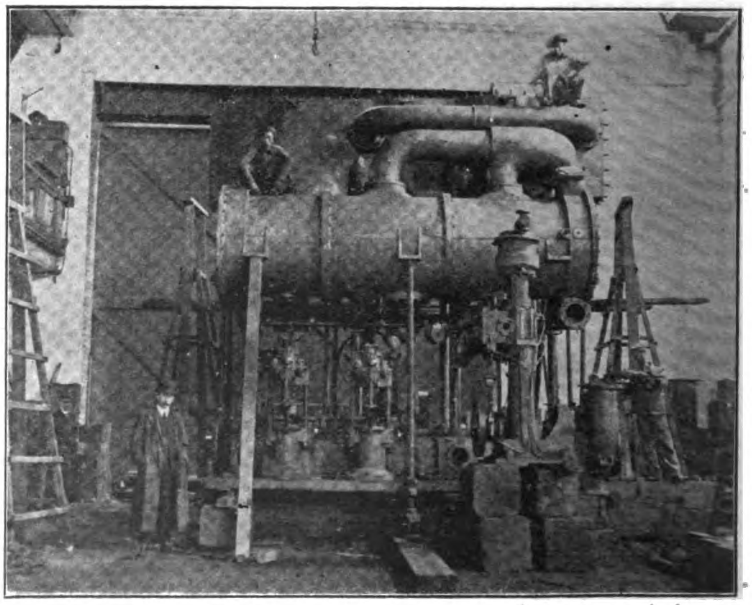
The deck fittings and equipment are most complete and include water service which can be used in case of fire, steam-heating ventilators, skylights, sidelights, accommodation ladders, etc.

PROPELLING MACHINERY.—The propelling machinery consists of one set of triple-expansion, surface-condensing, direct-acting engines, having cylinders 19½″, 31¾″, and 52″ diameter by 36″ stroke, and designed for a working pressure of 160 lbs. per sq. in. Steam is supplied by two large cylindrical return-tube steam boilers, 14′ diameter by 10′6″ long, designed for a working pressure of 160 lbs., and tested at 320 lbs. per sq. in. The main engines, built by Messrs. S. C. Farnham, Boyd & Co., Ltd., embrace all the best features of modern design, including cast steel conical pistons, expansion levers to each set of valve gear, "all round" steam reversing gear, easy means of access and overhauling, and large bearing surfaces. The cylinders rest on mild steel turned columns, back and front, with condenser supported at back and are arranged to suit Messrs. G. & J. Weir, Ltd., "dry air" pump installation, which is the first fitted in the Far East. It possesses many advantages, not the least being the removal of all pumps from the main engines and the consequent absence of pump levers, etc. In this case the pump is placed on top of a centrifugal pump cylinder and is driven by a continuation of the pistonrod. Immediately below the condenser are two vertical single-cylinder pumps for drawing off condensed water and discharging to Weir's "direct contact" feed header, which a pair of Weir's boiler feed pumps discharge to the main boilers.

PUMPING ARRANGEMENTS.—The centrifugal pump for circulating water through the condensers is of Messrs. Drysdale & Co.'s make and is driven direct by a single-cylinder vertical engine, a large steam ballast pump and a steam sanitary pump of Messrs. G. & J. Weir, Ltd., make, being fitted in the engine room. The pumping arrangement is most complete and is arranged for two separate pumps being available for every duty. To assist this idea being carried out, Messrs.

(Continued on page 294)





ENGINES AND ACCESSORY MACHINERY OF THE STEAMER *HSIN-KONG*

FAR EASTERN ENGINEERING, CONSTRUCTION, COMMERCIAL AND FINANCIAL NEWS

ELECTRIC LIGHTING, ETC

TELEPHONE SERVICE, KOREA.—A telephone service has been opened between Seoul and Chemulpo.

TOKYO CITY RAILWAY.—A new section of this line, from the Kudan to Ichigawa, has been opened to traffic.

TELEPHONE EXTENSION, JAPAN.—The telephone service between Tokyo, Yokohama, Miyanoshita, Yumoto, Odawara, Kozu and Atami is now open to public business.

KANAGAWA-SHINAGAWA ELECTRIC LINE, JAPAN.—This railway has been opened to through traffic. The cars leave each terminus every 5 mins. The through fare is 18 *sen* single journey and 34 *sen* return.

KOBE RAILWAY COMPANY, JAPAN.—At a recent extraordinary meeting of shareholders in Tokyo it was decided to issue debentures with security not to exceed -Y-2,500,000, to change the company's regulations in order to enable it to undertake the business of supplying electric light and power to the public, and to increase the number of stations in the company's electric car line.

WATERWORKS AND IRRIGATION

PENANG (S. S.) WATER SUPPLY.—The municipal commissioners of Penang have given favorable consideration to a supplemental report upon the proposal to bring in an additional supply of water from Batu Feringgi and Tanjong Bungah, compiled by Mr. L. M. Bell, the municipal engineer. Mr. Bell estimates that the total cost of the improvement will be $1,095,000 Straits currency. Adding to this sum the cost of work referred to in former reports, the aggregate cost will be $1,635,000.

KOWLOON WATERWOKS GRAVITATION SCHEME.—The dam for this improvement to Hongkong's water supply, which will be about 100′ in height above ground level, has been constructed for half its height. The main from the storage reservoir to the service reservoir is nearly completed and will shortly be utilized for conveying the water from several perennial streams, thus materially increasing the present supply. The filter beds and catch water are in progress It is estimated that the whole of the works will be completed by the middle of 1907 but will be so far advanced as to afford a sufficient supply for present requirements by next dry season.

BUILDINGS

MODERN THEATER, TOKYO.—It is proposed to build a great modern theater at Tokyo, to cost -Y-2,000,000.

POSTOFFICE AND LAW COURTS, HONGKONG —It is anticipated that both of these buildings will be completed by the end of 1909.

NEW BRITISH CONSULATE, JAPAN.—The construction of a new building for the British consulate at Shimonoseki has been commenced and it is to be completed by the end of September next.

BRIDGES

YALU TO BE BRIDGED.—The Yalu River is to be spanned with an iron bridge for the purpose of carrying the railway which will join Wiju and Antung, thus bringing Fusan into direct communication with Mukden.

KOREAN BRIDGE OPENED —The Railway bridge across the Tainyong River, Korea, has recently been completed, and so the S. section of the Seoul-Wiju Railway is open to traffic as far as the S. bank of the Chhong Creek. The N. section also is open down to the N. Bank of the creek and passengers cross by an improvised foot-bridge Thus journey from Seoul to Wiju can at present be effected in 11 hrs. It used to take a week or more to make the trip.

YELLOW RIVER BRIDGE, CHINA.—The Great Yellow River Bridge in China was erected under the supervision of Messrs. Jadot and Clavier at a cost of Tls. 2,000,000. The first pile was driven December 21st, 1903, and the first train crossed the structure June 11th, 1905. The bridge, which is 9,860′ long and 25′ above the low water level, is supported on 940 steel screw piles filled with concrete, and there are 103 piers, the weight of cast-steel in the latter being 7,510 tons, and of wrought steel in the trusses 8700 tons.

PUBLIC WORKS

HIGHWAY FROM TRAM STATION TO PLANTATION-RD., HONGKONG.—By arrangement with the owners of the Peak Hotel, a portion of this road, where it affects their property, will be made immediately. When this arrangement has been fulfilled, the government will complete the road. The estimated cost of doing this is $8,300.

PUBLIC IMPROVEMENTS, PEKING.—The Chinese capital is half converted in its communications. Where one toiled laboriously through rough and muddy streets 2 yrs. ago one now moves with swiftness and comfort over paved thoroughfares. The city is criss-crossed with telephones, and many other modern innovations are being introduced.

ILIGAN-MARAHUI ROAD, MINDANAO, MORO PROVINCE, P. I.—The Government of the Moro Province has formally taken possession of the Iligan-Marahui road in Mindanao, constructed by the military, and the work of repairing the highway and placing it in first-class shape is being prosecuted. It is predicted that the road will be in excellent shape its entire length within 6 mos.' time.

MINES AND MINING

ECHIGO JAPAN PETROLEUM.—The output of Echigo Petroleum in 1905 amounted to 1,293,000 *koku*, of the value of -Y-4,330,000.

FUSHUN OPENED TO JAPANESE RESIDENCE.—Fushun, Manchuria, where the coal mines are located, has been opened to the residence of Japanese.

COAL CONSUMPTION, JAPAN.—It is estimated that 600,000 tons of coal will be consumed during the current yr. at the Wakamatsu foundry, Japan.

NEW MINING UNDERTAKINGS, CHINA. — Thirty-two new mining undertakings were registered with the Chinese Government in 1904. This is an increase of 26 over registrations during 1904.

GOLD BULLION, FORMOSA.—The total amount of gold bullion produced in Formosa and bought by the Bank of Formosa, from January to November, 1905, inclusive, was 498,710 *momme*, and its value was -Y-1,978,969.

MINING IN KWANGSI PROVINCE, CHINA.—The mining bureau in Kwangsi has notified the Peking authorities that the necessary capital has been raised to work the mines in that province, and that they will be started this spring.

RICH GOLD FIND, HUEI-CHOW, ANHUI, CHINA.—A Japanese mining engineer has inspected the mines in the Jurisdiction of Huai-Chow, Anhui, owned by the San Kiang Mining Company, and reports that they are rich in gold and well worth development.

WEIHAIWEI (N. CHINA) MILLS RESUME OPERATION.—The mills of the Weihaiwei Gold Mining Company, Ltd., have resumed crushing after being idle for about a yr. Two tons of ore sent to the United States have been assayed by American experts who have reported very fully, giving satisfactory results.

ANGLO-FRENCH QUICKSILVER AND MINING CONCESSION, KWEI-CHAU PROVINCE, CHINA.—Work has lately been confined to the development of the mines at Wenshanchiang and to the production of quicksilver and cinnabar. Exploring work shows that about 1-3 of the Province of Kwei-Chau contains a great deal of mineral, which belongs to the concession. Excellent ore is being obtained from two of the company's mines.

MANGANESE ORE, BORNEO.—Of 30,000 tons of manganese ore to be delivered during the current yr. by the British Borneo Exploration Company, 18,000 tons are of the best grade and 12,000 tons of the 2d grade. The buyers have the option of buying up 12,000 tons more of the best ore and up to 28,000 tons more of the 2d grade as soon as it may be obtainable. The sales have been effected at prices assuring a very satisfactory profit.

PAHANG (F. M. S.) GOLD MINES.—The Pahang gold output in 1904 was 18,004 ozs., but in 1905 only 9,661 ozs., a reduction of almost half. This is due to Raub being now the only working gold mine in the state, and to the list of closed mines being a long one—Punjom, Selensing, Kechau, Tekkai, Tui and Sepan. This is the first time during the last 11 yrs. that the gold export has failed to reach five figures, and, in this connection, it is interesting to note that the total output for the last 16 yrs., or since the commencement of British protection, had 231,269 ozs., or an average of 14,454 per yr.

COAL RESOURCES OF AUSTRALIA.—A paper recently read by Professor T. W. David before the Sydney University Engineering Society gives remarkable estimates of the coal resources of Australia. Assuming that 4,000′ would be the limit down to which coal could be profitably worked, it it calculated that there is a total of 150,000,000,00, tons of coal still available in the palaeozoic coal area of New South Wales and a like quantity in Queensland The great Morwell brown coalfields in Victoria are described as being the thickest masses in the world, consisting of two seams, one 265′ and the other 227′ in thickness; but the calorific value of this coal is greatly lessened by the high percentage of water which it contains.

GOLD MINES IN KOREA.—As efforts have recently been made by the Japanese authorities and other interested people to make it impossible for any of the gold mines belonging to the imperial household of Korea to be ceded to foreigners, the following list of mines concerned, according to *The Korea Daily News*, may be of interest:—Choong-chung Province, Chung-chu, Kong-chu and Choong-chu; Chulla Province, Kum-ku, Nam-wan, Ryeng-am and Kumsan; Kyeng-sang Province, Chung-seng, Kyeng-chu, Ulsan, Jaran, and Chang-an; Kang-won Province, King-sung, Hong-chun, Chun-chun, and Won-chu; Ham-kyeng Province, Purioug, Myeng-chun, Changhuri, Yong-am, Kilchu, Chang-chin, Chong-sung, and Sam-soo; Ping-an Province, Ping-yang, Soon-an, Cha-san, Unsan, Chang-sung, Duk-chum, Tai-chun, Kang-dong, Kang-soh, and Echu; Whang-hai Province, Song-wha, Cahg, chu, Suan, and Chai-riung.

GOLD MINING IN JAPAN.—Active measures are being taken by the departments of Agriculture and Commerce and of Finance, at Tokyo, to encourage the production of gold in Japan, with a view to strengthening the financial basis of the empire. The authorities mentioned have been in consultation with the Credit Mobilier, Ltd., which concern has decided to advance at least -Y-10,000,000 for the purpose of developing the gold mining industry. Moreover, gold mines will enjoy certain privileges, including exemption from mining tax. The principal gold-bearing districts in Japan are Keelung, Formosa, Kagoshima Prefecture, and the N. part of Niigata Prefecture in Fukuoka, Akita, Yamagata, Ishikawa, Fukui, Gifu, and Shizuoka prefectures, and in part of the Kokkaido, gold is also produced in good quantity. The government and the Credit Mobilier estimate that the production of gold, which at the present averages -Y-10,000,000 *per annum*, can be at least doubled by the new measures to be adopted, and this result is expected to be attained in 3 yrs.

BORNEO OIL OUTPUT.—The following statistical figures have been given from the fields in Borneo for the four 13 weeks and the whole yrs. 1905 and 1904, showing in tons the following petroleum output of the industry in the island:—

	Four 13 weeks 1905.	1904.	Years. 1905.	1904.
Production—				
Crude oil	139,120	81,600	421,695	285,720
Crude oil sold	—	8,687	33,839	19,748
Intake of refineries	113,206	76,329	347,635	255,081
Output of the refineries—				
Kerosene	49,026	26,953	145,789	79,647
Other products	52,000	40,863	166,061	143,774
Shipments—				
Kerosene	88,020	22,542	123,714	73,180
Other products	32,904	41,408	146,402	184,767

	Dec. 30, 1905.	Dec. 31, 1904.
Crude oil in stock ground	46,649	23,377
Stock awaiting shipment—		
Kerosene	31,237	9,225
Other products	30,092	10,644

INDIAN GOLD MINING RETURNS.—Following are the returns for the mo. of January, 1906.—*Balaghat.*—4,400 tons of quartz crushed yielded 3,524 oz., and 2,750 tons of tailings cyanided yielded 295 oz., making a total of 3,819 oz. of gold. *Champion Reef.* Milled 19,350 tons which produced 15,049 oz and 16,758 tons, of tailings treated by the cyanide process produced 2,173 oz, making a total production of 17,222 oz. of gold. *Mysore.*—16,150 tons of quartz crushed produced 15,252 oz. and 14,973 tons of tailings cyanided yielded 1938 oz., making a total production of 17,190 oz. of gold. *Mysore West.*—Mill ran 721 hrs., crushed 1,944 tons, which yielded 1,047 oz. bar gold, and 2,497 tons of tailings treated by the cyanide process yielded 167 oz. of standard gold. *Nundydroog.*—6,900 tons quartz crushed yielded 5,325 oz., and 6,750 tons of tailings cyanided yielded 573 oz, making a total production of 5,898 oz. of gold. *Ooregum.*—Stuff crushed 10,229 tons produced 4,52 oz. and slimes and tailings cyanided 10,886 tons produced 1,000 oz, making a total return of 5,528 oz. of gold. *Hutti.*—(Nizam's)—2,050 tons of quartz crushed yielded 859 oz and 2,000 tons of tailings cyanided yielded 280 oz, making a total production of 1,139 oz. of gold estimated value Rs. 66,000.

THE KOLAR GOLD FIELDS —For the past decade the outputs have been as follows:—

Yr.	Oz.
1896	321 023
1897	389,779
1898	416,236
1899	440,249
1900	493,842
1901	504,848
1902	514,291
1903	597,786
1904	606,233
1905	615,561

According to the monthly statements issued by the companies, showing approximately the amount of ore and tailings treated and the yields of gold, the returns for the past yrs. have been as follows:—

	1904. Quartz milled.	Gold from all sources.	1905. Quartz st'mp'd.	Gold from all sources.
	Tons.	Ounces.	Tons.	Ounces.
Champion Reef.	184,654	212,974	226,455	215,023
Mysore	191,000	201,968	195,650	205,889
Ooregum	127,449	73,621	121,599	66,236
Nundydroog	75,840	68,340	79,070	70,561
Balaghat	36,000	31,034	48,820	42,530
Tank Block	24,284	12,328	25,116	12,472

FEDERATED MALAY STATES TIN, 1905.—The *Perak Pioneer* says that the tin statistics for the past year are now available. The following is a brief summary:—

	1605. Output. Piculs.	1904. Output. Piculs.
Perak	446,781 52	450,670 31
Selangor	289,866.74	304,701.16
Negri Sembilan	85,132.60	85,688.41
Pahang	34,879.10	28,067.90

The above results thus:

	Increase Piculs.	Decrease Piculs.
Perak	..	3,888 81
Selangor	..	14,834.42

Negri Sembilan	..	555.81
Pahang	6,811.20	..
Net decrease		12,467.94

It will be noticed the greatest falling off occurred in Selangor.

The tin revenue is as under:—

	1905. Duty.	1904. Duty.
	$	$
Perak	4.874,820 82	4,607,558.72
Selangor	3,195,317 72	3,138,649.59
Negri Sembilan	939,616 96	888,393.79
Pahang	239,872.01	178,808.87
	Nett decrease	12,467.83
Totals	9,249,627.51	8,813,410.97

The above yields an increase of $436,216.54 but a the budget of the four states of the federation only anticipated a revenue of $7,907,400, the surplus is actually $1,542,217.51.

RAILWAYS, SUPPLIES, ETC

SEOUL-WIJU RAILWAY, KOREA.—The Chuwa tunnel on this line has been completed and is now serving the purpose for which it was constructed.

NATIONALIZATION OF RAILWAYS, JAPAN.—The Japanese Government is introducing a bill to the diet to nationalize the railways within the empire.

MANCHURIAN RAILWAYS.—The question is now being discussed in Japan whether to retain or alter the extremely narrow (Japanese) railway gauge, temporarily adopted during the war, on that portion of the East China Railway which fell into Japanese hands. Popular sentiment in railway circles is for the broad gauge.

TIENTSIN-CHINKING RAILWAY —The metropolitan officials who are natives of Chihli, Shantung and Kiangsu decided recently to cancel the agreement about the railway between Tientsin and Chinking, and the viceroy is asked to negotiate with the German authorities to cancel the German portion of the concession.

RAILWAYS IN FUKIEN, CHINA.—Plans have about been consumated to commence work on the construction of these lines immediately It is understood that the line from Amoy to Chan-Chou, 90 *li* long, will be first constructed and put in operation, as a specimen of the whole line to be constructed for the benefit of capitalists.

HSIN-MIN-TUN-TO-MUKDEN RAILWAY.—The Russian authorities object to China constructing a railway from the former to the latter point on the ground that such a line would be in violation of the principle of the Manchurian Agreement which debars any railway coming within 40 *li* on either side of the Chinese Eastern Railway.

ANHUI RAILWAYS, CHINA.—The director-general of Anhui Railways calculates that Tls. 4,000,0C0 now being subscribed will not be sufficient for all the requirements of the Wuhuh-Kuangtechou Railway, which is about 280 *li* in length, and has decided to raise an additional Tls. 1,000,000. It is expected that actual work will commence in June of the current yr.

HANKOW-CANTON RAILWAY.—A meeting was recently held in Canton to consider the Hankow-Canton Railway scheme and was attended by 10,000 merchants and others. It was agreed that those present should themselves subscribe £2,000,000 in 4,000,000 shares of $5 (Mex.) each A bank to carry out the necessary financial arrangements is already being established. It will be managed by merchants, not by officials.

YUNNAN RAILWAYS.—The Yunnan students who are at present studying in Japan have protested against a British proposal to construct a railway from the frontier of Burma to Teng-yueh, by a British-Chinese company. The students declare that such a step would be tantamount to giving up Yunnan to foreigners, an example of which being furnished by the Chinese Eastern or Manchurian Railway, which was the means of China nearly losing Manchuria to Russia.

RAILWAY IN KANSU, CHINA.—The viceroy of Shen-Kan (Shensi-Kansu) has, in concert with the gentry and representative merchants of Kansu, drawn up a scheme for raising a sum of $1,300,000 for the construction of a railway system in their province. The viceroy has telegraphed the scheme to the Waiwupu and Shangpu, besides telegraphing to the Kansu officials at the metropolis, who are requested to bear a share of the burden in raising the required amount.

RAILWAY INFORMATION WANTED AT PEKING.—The Board of Commerce of the Chinese Government being short of information regarding the railways of the empire, the minister of the board has directed the various viceroys and governors to furnish full particulars of all railway works, together with copies of all official documents and plans, etc, connected therewith. The viceroys and governors are also ordered to do their utmost to raise the necessary funds for pushing on the work of building all urgent railways.

FENGTAI-SHAHO SECTION, PEKING-KALGAN RAILWAY.—The director of the Peking-Kalgan Railway reports the completion of the Fengtai-shaho section which has been opened to traffic. The engineer in-chief, Taotai Chan Tien-yu, will soon receive bids for the construction of the tunnel through Pataling Mountain, which is about 2,000′ in height. The cost of the tunnel is estimated at Tls. 2,000,000. Some reports have it that the contract has already been secured by a foreign firm at Tientsin, but they are not believed to be well grounded.

MEKLONG RAILWAY COMPANY, LTD., BANGKOK —At the first general meeting of the shareholders of this company the directors presented a statement of accounts for the construction of this line. The work on the whole line has proceeded most satisfactorily. Piles for six bridges have been completed and 20 kms. of rails have been laid. The concession cost Tcs. 180,000 and during 1905 advance payments on rolling stock were made to the amount of Tcs. 70,000, and the construction executed represents an outlay of Tcs. 101,2C0.

RAILWAY LINES, JAPAN.—In the work of laying double lines in the government railways 292 ms. have thus far been completed, while 19 ms. are in course of construction, and 71 ms. are not yet commenced. Of the total of -Y-300 000 set down for repairs of government railways in the budget for the current fiscal yr., -Y-67,000 are meant to be partly for lines under construction and partly for lines not yet started, *viz.*, 16 ms. between Ishibe and Kanaya; 15 ms. S. along the Kakegawa and Tenryugawa; 24 ms. between Okazaki and Atsuta, and 19 ms. between Nagoya and Gifu.

PORT WORKS, DOCKS, ETC.

KAWASAKI DOCKYARD COMPANY, LTD., KOBE.—This company has orders for 31 various vessels. It will extend its works, raising its capital from -Y-4,000,000 to -Y-10,000,000, and borrow -Y-10,000,000 abroad by debentures.

WHANGPU CONSERVANCY, SHANGHAI.—Mr. J. de Rijke, the new engineer for the Whangpu Conservance Board, Shanghai, has arrived in the settlement and indications now point to great activity towards beginning this important work.

NEW WHARVES, ZAMBOANGA, MORO PROVINCE, P. I.—Plans are being prepared for new docks at Zamboanga, the capital city of the Moro Province, which will cost in the neighborhood of ₱90,000. These docks will be constructed so as to admit vessels drawing 30′ of water.

ANOTHER DREDGE OF CALCUTTA.—The Calcutta port commissioners have ordered of Messrs. Wm. Simons & Co., Ltd , Renfrew, a very large sand suction pump dredge, fitted with four sets of independent triple-expansion engines and four large cylindrical boilers, to dredge sand at the rate of 5 000 tons per hr. The new craft will be utilized for the improvement of the River Hooghly.

YOKOHAMA DOCK COMPANY.—This company contemplates an enlargement of its largest dock to the extent of 100′ so that any vessel of 12,000 or 13,000 tons may be docked It also intends to adopt electricity as the motive power in all workshops. The company has first decided to construct a wet dock, on the E and W. sides of which two vessels of over 5,000 tons may be repaired simultaneously. Work on the wet dock has been commenced.

YOKOHAMA HARBOR IMPROVEMENTS —According to the present plan the proposed Yokohama harbor improvement scheme will be extended over a period of 6 yrs, and will require an outlay of about -Y-8,500,000 The City of Yokohama will provide ⅓ of the sum. It is believed that the municipality will raise the money by a loan, and one of the foreign firms of the city is reported to have applied already to the mayor for permission to take up the whole of the proposed loan.

NEW DOCK, JOLO, MORO PROVINCE, P. I.—The new dock at Jolo has been finished by the Atlantic, Gulf and Pacific Company, and cost the Moro Province which is meeting all expenses of public improvements in that section, about ₱26,000. Steamers drawing 26′ of water can tie up alongside the new dock for discharge, which advantage not only results in prompt discharge of cargoes and naturally a liberal reduction in freight rates, but proves of great convenience to Jolo merchants.

PORT IMPROVEMENTS, PHILIPPINE ISLANDS.—The following sums, or so much thereof as may be necessary, have been appropriated by the Government of the Philippine Islands for public works and improvements by the Bureau of Port Works:—For completion of existing contracts for the new harbor of Manila, and for the continuance of the improvements of the Pasig River, and incidental expenses, -P-500,000; for additional expenses incident to modification of plans for the improvement of the port of Cebu, -P-241,520; for the maintenance of two survey parties to investigate the ports of the Philippine Archipelago which are destined to be railway termini, and other ports, -P-36,000. In all, -P-677,520.

SINGAPORE HARBOR IMPROVEMENTS.—The crown agents for the colonies have announced to the Government of the Straits Settlements that the most favorable tender for the Singapore harbor improvements is that of Sir John Jackson, Ltd., London, at £991,000 with £39,293 added for making the depth of water alongside quayage 18′. This makes a total estimate of £1,030,693, say, allowing for contingencies and exchange, etc., $10,000,000. For this sum the contractors will undertake all the work mentioned in the report of Messrs. Coode Son & Matthews, which has appeared in THE REVIEW, excluding the S and E. moles. Thus what Singapore is to get is the W. mole, lying off Malay Point, and the inner S. mole sheltering this and the Telok Ayer reclamation generally, and also the latter reclamation. In short, the proposed reclamation at Telok Ayer with 18′ depth of water at the quayside and the inner basin, such being the area of water protected by the W. mole and the inner S. mole, the general scheme of a large and extensive harbor as formed by the S. and E. moles being left untouched for the present with the proviso that the contractors may be required if necessary to carry out this work also within 2 yrs. from the acceptance of the present tender. Under the tender the contractors assume all risk with the exception of the possible settlement of rubble in the moles in excess of quantities shown by the contract drawings. The consulting engineers consider this proviso practically negligible as affecting the cost of the improvement. The time required to complete the entire work is 13½ yrs.

SHIPBUILDING, MARINE, ETC.

MITSU BISHI'S FIRST WARSHIP.—The first warship built at the Mitsu Bishi yard at Nagasaki, the destroyer *Shiratsuyu*, 381 tons and 29-knot speed, has been launched.

NIPPON YUSEN KAISHA.—This Japanese steamship company has re-opened its 4-weekly service between Hongkong and Seattle. The monthly service to Australia has also been resumed, the first steamer being *Yawata-maru*, sailing from Yokohama and Nagasaki.

TRIAL RUN OF JAPANESE DESTROYER *Asakaze*.—A trial run of the destroyer *Asakaze*, constructed by the Kawasaki Dockyard Company, Ltd , at Kobé, took place recently, and the result was highly satisfactory to commissioners of the Imperial Navy Department who were on board.

MESSRS. BAILEY & CO., HONGKONG.—A new steam launch built to the order of the China Merchants Steam Navigation Company by Messrs. Bailey & Co., by which firm it was also engined, has been delivered at Foochow. Her name is *Shun Lee*, and she is intended to be used in the private business of the China Mutual at Foochow. She is 55′ long and has a speed of 9½ knots.

ROYAL MAIL STEAM PACKET COMPANY.—This company, the oldest established steamship line in the world, has purchased the goodwill and interest in the Orient Line of the four vessels belonging to the Pacific Steam Navigation Company. The purchase thus consists at the present of *Ortona Ortova, Oruba*, and *Oroya*. These vessels, in conjunction with the Orient Line, now carry the Australian mails to England, and the working of the joint line will be continued as hitherto.

NEW CHINA MUTUAL CARGO STEAMER.—Messrs. Armstrong, Whitworth & Co. recently launched at their shipbuilding-yards in England a large cargo steamer for the China Mutual Steam Navigation Company, of Liverpool *Myrmidon*, as she is named, is of the following dimensions:—Length over all 409′, breadth 49′3″, depth 31′6″. She carries a total dead weight

STEEL SCREW STEAMER "HSIN-KONG"

(Concluded from page 292.)

G. & J. Weir, Ltd., supplied a separate "stand-by" independent dry air pump driven direct by vertical steam engine.

The main bilge pumps, two in number, are placed horizontal on an engine seat and are driven direct by a main crank shaft, with arrangement for overhauling one while the other is working.

A "Hocking" patent distiller of 1,000 galls. capacity per 24 hrs. is fitted on the upper platform of the engine room, steam being supplied by a donkey boiler with a filter and distilled-water connection to the storage tank.

BOILER INSTALLATION.—The main boilers, built by Messrs. S. C. Farnham, Boyd & Co., Ltd., are of large power for the speed of the vessel and are designed to British Board of Trade requirements for a working pressure of 160 lbs. per sq. in. They possess all the latest improvements in boilermaking, the shell plates being in one continuous length and the end plates flanged by special machinery. They are fitted with the usual mountings and are placed thwartship with a large roomy stokehole at the after end.

The donkey boiler, also built by Messrs. S. C. Farnham, Boyd & Co., Ltd., is of the "Cochrane" type, 13′ high by 6′ diameter, designed for a working pressure of 100 lbs. per sq. in., and placed in a recess between the engineroom and the stokehole. It is fitted with a separate feed donkey, to allow of steam being supplied to dynamo, winches, steering engine, windlass, heaters, and all auxilliary pumps, etc.

All other engineroom fittings are most complete and include a large stock of spare gear, outfit, Chadburn's telegraph to the bridge, oil tanks, etc.

of 7,000 tons on a moderate draught of water. She will be fitted with triple-expansion engines, and the speed designed is about 12 knots.

NEW CHINA COAST STEAMER.—The new steel steamer *Cheong Shing* (Prosperous Promotion), built by Messrs. W. Dodson & Co., Low Walker-on-Tyne, to the order of the Indo-China Steam Navigation Company, Ltd., of London, for its service on the China Coast, was given a successful trial trip recently. This vessel, which is of the spar-deck type, with bridge and forecastle, is of the following dimensions:—Length between perpendiculars, 265′; breadth, 47′; depth moulded, 23′; and she is designed to carry a dead-weight of about 2,600 tons.

CANADIAN PACIFIC'S PACIFIC SERVICE.—The Canadian Pacific Railway Company's SS. *Monteagle*, which has been detached from the company's Atlantic fleet to supplement its intermediate service on the Pacific, sailed recently from England for Hongkong *via* the Cape of Good Hope. The finishing touches to her excellent new passenger accommodations will be given to her at Hongkong, and she will be ready to sail hence for Vancouver, *via* Shanghai, Nagasaki, Kobé and Yokohama, May 2d, making her due at destination May 26th, as per schedule. *Monteagle* is a twin-screw steamship of 5,500 tons.

JAPANESE SHIPOWNERS' UNION.—The Japanese Shipowners' Union is an amalgamation of small shipowners possessing altogether about 180 steamers with an aggregate tonnage of 350,000. A few vessels are large, but most are coasters of moderate tonnage. This union has long cherished a desire to establish a great ocean line, and rumor says that the idea will soon be carried out. There are to be regular lines to Korea, China, Europe, and America, both North and South. It is reported that the company has received offers from South America, Oceania, and China, from people wishing to join. There is talk of raising -Y-20,000,000 capital.

NIPPON YUSEN KAISHA'S EXTENDED SERVICE.—This company's regular European line, taking freight and passengers between Japanese ports, Shanghai, Singapore, Penang, Colombo, Suez, Port Said, Marseilles, London and Antwerp, will be resumed in April, opening with the SS *Bingo-maru*, leaving Yokohama about April 4th, to be followed by the SS. *Sado-maru* or *Kawachi-maru* on or about April 18th; thereafter one steamer every fortnight. The American line, between Hongkong, Shanghai, Japan ports and Seattle (connecting there with the Great Northern Railway), will also be resumed, beginning with *Shinano-maru*, to leave Hongkong April 3d. There will be provisionally a monthly service, after which a regularly fortnightly service will be maintained.

MESSRS. HOWARTH ERSKINE, LTD., SINGAPORE.—The railway department of the Federated Malay States recently placed a contract with this firm for a new tug for use at Port Swettenham. This boat has just been completed under survey of the government marine surveyor with most satisfactory results. At the official trial both speed and towing were in excess of the contract to the extent of ¾ of a knot and 1¾ ms. respectively In the first case 10 knots per hr. was attained, and in the second 6¾ ms. In the experiments two 75-ton tongkongs with 60 tons of cargo in each were towed The scantlings, boiler and engines are in excess of Board of Trade requirements, and the built and finish of the boat have evoked unqualified approbation from those competent to judge, and the work reflects great credit on the firm—Singapore *Free Press*.

FINANCIAL

FUJI PAPER MILL, JAPAN.—This company paid a dividend at the rate of 10 per cent *per annum* on its 1905 business.

FIRE INSURANCE COMPANIES, JAPAN.—In view of the present cut-throat competition, it is proposed to amalgamate the Japanese fire insurance companies.

SHANGHAI-SUMATRA TOBACCO COMPANY, LTD.—This company has declared a final dividend of Tls. 3 for 1905, making in all Tls. 5 per share for the year.

TOKYO STREET RAILWAY.—The net profits of the Tokyo (Japan) Street Railway during the half-yr. ended December 31st, 1905, were -Y-353,822. Two dividends were paid.

TOKYO GAS COMPANY —At a general meeting of the Tokyo Gas Company held at the Tokyo Chamber of Commerce recently, a dividend at the rate of 15 per cent *per annum* was declared for the latter part of 1905.

POSTAL SAVINGS BANKS, JAPAN.—The deposits in Japanese postal savings banks were -Y-33,300,000 at the end of 1904 and -Y-52,000,000 at the end of 1905, showing the remarkable increase in 1 yr. of nearly -Y-19,000,000.

SHANGHAI TUG AND LIGHTER COMPANY, LTD.—This company has declared a final dividend of Tls 3 for the ordinary and Tls. 1 75 for the preference shares, making in all Tls 5 and Tls. 3 50 respectively, for the year ended December 31st, 1905.

W. F. STEVENSON & CO., LTD —W. F. Stevenson & Co., Ltd., have been registered in London with a capital of £50,000. and have acquired the business of the same name—merchants, commission agents, etc.—in Manila and elsewhere in the Philippine Islands.

LAOU KUNG MOW COTTON SPINNING AND WEAVING COMPANY, LTD.—This company has written off Tls. 34,039.86 to depreciation account. The working of 1905 shows a credit at profit and loss account of Tls. 178,685.28 including Tls. 10,000 brought forward from 1904.

JAPAN (KIRIN) BEER BREWING COMPANY, LTD.—The report of this company for 1905 shows a divisible balance of -Y-128,702 the paid-up capital of the company being -Y-450 000. The beer tax paid for the year amounted to -Y-183 228, and a dividend of 20 per cent will be paid.

FISHERY BANK, JAPAN.—It is stated that a bill for the establishment of a fishery bank will be introduced into the Japanese Diet shortly. The capital of the proposed bank will be -Y-10,000 000, and the institution will be authorized to issue debentures to the limit of five times its capital.

WEST POINT BUILDING COMPANY, LTD, HONGKONG.—The report of this company for 1905 shows a divisible balance, less the interim dividend of $1.75 per share already paid, of $24,523. It is proposed to pay a final dividend of $1 90 per share, making $3.65 for the yr., and carry forward the balance, $773.

NIPPON RAILWAY COMPANY.—The report of this company for the half-year ended December 31st, 1905, shows a divisible balance of -Y-4 814,194. It is proposed to pay a dividend at the rate of 13 per cent *per annum*, making appropriations to reserve, depreciation, etc., and carry forward -Y-676,072.

TOKYO ROPE FACTORY.—It is announced that the Tokyo Rope Factory in Azabu, which is under the presidency of Baron Shibusawa, is now going to extend its business, and to raise fresh capital to the extent of about -Y-300,000. A branch factory will be established in Kokura, Buzen Province, shortly.

KEIHIN ELECTRIC COMPANY, JAPAN.—At the recent general meeting of this company the balance-sheet for the half-yr. ended December 31st, 1905, showed net profits totalling -Y-56,786 15 which includes -Y-309.-36 brought forward from previous account A dividend of 8 per cent *per annum*, amounting to -Y-51,000, was declared.

HONGKONG LAND INVESTMENT AND AGENCY COMPANY, LTD.—The report of this company for 1905 shows a divisible balance, less the interim dividend of $3.50 per share already paid, of $242,839. A final dividend of 3 1-3 per cent has been declared, making 7 per cent for the yr., and the balance, $67,839, has been carried forward to current account.

KIANGSI RAILWAY BANK, CHINA.—It has been decided to locate the railway bank at Kiukiang, while branch banks will be established at Shanghai, Hankow and Nanchang. Funds have already been remitted from the head office of the railway at Nanchang to Kiukiang, for the preliminary expenses of establishing the aforementioned bank.

CANTON-HANKOW RAILWAY.—It was recently ordered that the intending shareholders in the Chinese company formed to undertake the construction of the Canton-Hankow Railway shall pay their subscriptions in 20c pieces. As the capital subscribed at that time was about $4,000,000 and growing rapidly the next thing to look for is a "corner" in 20c pieces very soon.

OSAKA SHOSEN KAISHA, JAPAN.—This steamship company has formally determined to increase its capital stock from -Y-11,000,000 to -Y-16,500,000. The new shares will be offered to the present shareholders at the rate of one new share to every two old ones, and those who intend to take up the new shares must deposit -Y-1 for each new share, by April 15th. On May 1st there will be the first call of -Y-7 per share.

HOKKAIDO COLLIERY AND RAILWAY COMPANY, LTD.—The issue has been made of bonds for £1,000,000 of this company, on the London market. The issue is in 1st-mortgage 5 per cent sterling bonds at 98 ½ repayable in 1921. The subscription list was to have been kept open three days, but the issue was so well received that it was closed in less than 36 hrs. It is believed that the issue has been taken mainly by investors.

SHANGHAI'S BUDGET, 1906.—It is unofficially announced that the Municipal Council of the settlement estimates the ordinary public expenses for the yr. at Tls. 1,774,000 and that at the end of the period there will be a surplus of Tls. 260,000. This surplus, with that from 1905—about Tls. 220,000—is carried to extraordinary income; but as the extraordinary expenditure is estimated at Tls 529,500,000 there will be a deficit at the end of 1906 of Tls. 47,500.

KOWLOON LAND AND BUILDING COMPANY, HONGKONG.—The net profits of the 1905 working amounted to $15,746 50 as against $18 291 24 for 1'04. This is accounted for by the gross rents being about $800 less, the absence of the item of unclaimed dividends which appeared the previous yr , and by the large sum expended on the drainage and other repairs required by the sanitary regulations. Messrs. T. F. Hough and A. Rodger have been re-elected directors.

SOY CHEE COTTON SPINNING CO., LTD., SHANGHAI.—March 6th the eleventh ordinary meeting of the shareholders in this company was held in the office of Messrs Arnhold, Karberg & Co. The general manager reported that the native cotton crop of 1905 has been a very satisfactory one and the whole of the production sold at very remunerative prices. The working of the yr. shows a balance at credit of profit and loss account of Tls 206,824 19, including an amount of Tls 22,050.78 carried forward from 1904.

HOKKAIDO COLLIERY AND RAILWAY COMPANY, JAPAN.—This company has declared a dividend of 15 per cent on the working of 1905 and carried forward to current account -Y-500,000. A scheme is on the tapis to organize another colliery company in Hokkaido, to be called Ishikari Tanko Kabushiki Kaisha, With a capital of -Y-15,000,000. The promoters are Baron Shibusawa, Mr. S. Asano, Mr. K. Okura, Mr S. Nakamura, and others Half the shares will be offered, in all probability, for foreign subscription.

HONGKONG, CANTON AND MACAO STEAMBOAT COMPANY, LTD., HONGKONG.—The report of this company for the half-yr. ended December 31, 1905, shows that after paying running expenses, etc., there remains, including the sum brought forward from previous account, $104,080.93 at credit of profit and loss account. From this amount a dividend of $1 per share amounting to $80 000 will be paid to shareholders and the balance, $24,080.93 carried forward. The Hon. Mr. C. W. Dickson and Mr. H. Schubart resign their seats at the board and are succeeded by Messrs. W. A. C. Cruickshank and C. R. Lenzmann.

OJO COLLIERY COMPANY, JAPAN.—This company is a joint stock concern which was established some 12 yrs ago, with a capital of -Y-100,000 for the purpose of working one of the Ikawi coal mines It was not a success at the first, and a series of misfortunes brought the company into such a distressful condition that it was on the verge of dissolution, when the management came into the hands of Messrs. Y. Kawai and Y. Hamamoto, as directors. Since then the business of the colliery has assumed a different aspect and at the recent half-yearly meeting of the company a most gratifying condition was reported.

SHANGHAI PULP AND PAPER COMPANY.—The report of this company (1905), the paid-up capital of which is Tls. 450,000, is a remarkable good one. The net profit for the year was over Tls 100,000, and after paying an interim dividend of 6 per cent, writing off Tls. 9,362 for additions and repairs, and Tls. 11,090 for depreciation, placing Tls. 12,000 to reserve and Tls. 8,000 to equalization of dividend funds, there remains a divisible balance of Tls. 38,753 (including Tls. 5,968 brought forward from 1904). The directors propose to pay a final dividend of 8 per cent, making 14 per cent for the year, and carry forward the balance, Tls. 2,753 to current account.

BANGKOK MANUFACTURING COMPANY, LTD.—In their report for the half-yr. ended December 31, 1905, the directors of this company show net profits on the sale of ice and aerated waters for the 6 mos. amounting to Tcs. 26,222 From this the usual 6 per cent dividend has been declared. This absorbs Tcs. 16,800. The balance of Tcs. 20,000 due for the premises recently acquired from the Siam Electricity Company, Ltd., is now paid for in full and the debentures amounting to Tcs. 16,500 have all been redeemed. The new ice plant is now under erection When this is completed the company's plant will be capable of producing 32 tons per day, a quantity that should be sufficient to meet the demands of consumers during the next 10 yrs.

MISCELLANEOUS

AMALGAMATION OF SUGAR INTEREST, JAPAN.—It is reported that there is a plan on foot in Osaka to amalgamate all the sugar refineries of Japan, but the negotiations are making slow progress.

MATCH FACTORY AMALGAMATION, JAPAN.—The scheme of the amalgamation of all the match factories of Japan has been completed, and the union is now only waiting for the diet to pass a bill concerning business monopolies, and then the realization of the scheme is expected to be complete.

DEVELOPING CHINESE MANUFACTURES —A supervising censor of the Chinese Government recently presented a memorial to the officials at Peking, calling attention to the fact that the import of foreign manufacturers is daily increasing and that it is imperative for China to establish manufactures of her own, purchasing the necessary machinery from foreign countries. The memorial has been approved

ENGINEERS' ASSOCIATION OF SINGAPORE —At the annual general meeting of the Engineers' Association of Singapore, recently held, the following officers were elected:—President, James Le Mesurier; vice-president, A. Cook; honorary secretary, Alex McLellan; honorary treasurer, James Graham; honorary assistant secretary, William Frew; house committee, W Hepburn, A. Lyon, A. Birnson and W. Houston. The association is in a prosperous condition.

INSTITUTION OF ENGINEERS AND SHIPBUILDERS, HONGKONG.—This association has elected the following officers for the current yr :—President, H T. Richardson; vice-president, J Lambert, R N. R., and E. O. Murphy; committee of management, W A. Crake, W. Ramsay, J. F. Miller, E. C Wilks, W. C Jack, T W Robertson, A Ritchie, J. D. Morrison, T Skinner, J. D. Logan C F Focken and J. McCubbin. This association has 291 members at the present time.

COTTON MILL INDUSTRY, CHINA —The report issued by the general managers of the Laoukungmow Cotton Mill, Messrs. Ilbert and Co , of Shanghai, of the working of that industry during 1905, is encouraging On a paid-up capital of Tls. 795,800 the actual profit is Tls. 178,685, and the directors pay a dividend of 8 per cent, put over Tls 75,000 to depreciation, or more than double what was set aside the previous year, and are able to carry forward nearly Tls. 31,000.

SUCCESSFUL SUGAR SEASON, QUEENSLAND.—The past sugar season in the State of Queensland, Australia, the only state in Australasia in which sugar is grown, has been a very successful one. The crop for 1904 was the largest since 1898 and the second largest on record. There were 120,317 acres under cane, 82,741 acres of cane crushed and 147,688 tons of sugar manufactured. The by-products consisted of 4,491,407 galls of molasses and 260,289 galls. of spirits. Increased prices were obtained, being $61.04 per ton against $54.32 in 1903 on the basis of 94 per cent sugar.

FAR EASTERN SHARE QUOTATIONS

COURTESY OF BENJAMIN, KELLY & POTTS, SHAREBROKERS, HONGKONG, March, 1906.

STOCK	WHEN ESTABLISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation. PER CENT	CLOSING QUOTATIONS
Banks.												
Hongkong and Shanghai Banking Corporation	1865	$10,000,000	80,000	$125	$125	g £1,000,000 s $8,500,000 i $250,000	$1,699,777	31-12-05	£1 15/- div & £1 bonus @ ex. 2/0-9/16 $26.87 for second half-year 1905	26 2-06	5	860 London £91½ ex div. and bonus
National Bank of China, Limited	1891	£699,475	99,925	£7	£5	$200,000	$41,768	31-12-04	$2 (London 3/6) for 1903	1-2-04	—	$38 buyers
Marine Insurances.												
Canton Insurance Office, Limited	1881	$2,500,000	10,000	$250	$50	$1,600,000 j $147,895	$211,540	31-12-04	$20 for 1904	21-10-05	6	$340 buyers
China Trader's Insurance Co., Ld.	1865	$2,000,000	24,000	$83.33	$25	$950,000 f $169,215 j $202,455 u $296,955	Nil.	30-4-05	$4½ for year ended 30-4-1905	18-12-05	5	$94
North China Insurance Co., Ld.	1863	£150,000	10,000	£15	£5	g £100,000 s Tls. 100,000 f Tls. 50,000	Tls. 302,053	30-6-05	Final of 7/6 making 15/- for 1904	25-10-05	5½	Tls. 95
Union Insurance Society of Canton, Limited	1867	$2,500,000	10,00 0	$250	$100	s $2,000,000 g £40,000 f $331,453 j $1,043,930 u $1,152,346	$2,339,112	30-6-05	$40 for 1904	20-10-05	5¼	$750 buyers
Yangtsze Insurance Association, Ld.	1862	$800,000	8,000	$100	$60	$750,000 i $50,000 j $5,890	$599,364	31-12-04	$12 and $3 special dividend for 1903	12-4-05	7¼	$180
Fire Insurances.												
China Fire Insurance Co., Ld.	1870	$2,000,000	20,000	$100	$20	$1,000,000 x $218,039 f $2,241	$260,374	31-12-04	$6 dividend and $1 bonus for 1903	10-3-05	8	$89 buyers
Hongkong Fire Insurance Co., Ld.	1868	$2,000,000	8,000	$250	$50	$1,200,505	$360,372	31-12-04	$34 for 1903	7-3-05	10¾	$325 sellers
Shipping.												
China and Manila Steamship Co., Ld.	1882	$750,000	(1) 30,000	$25	$25	$5,000	$8,832	31-12-04	$1 for 1904	27-3-05	5	$21 sellers
Douglas Steamship Co., Ld.	1883	$1,000,000	20,000	$50	$50	$261,638 i $88,941	Nil.	30-6-05	$3½ for year ended 30-6-1905	25-9-05	8¾	$40 buyers
Hongkong, Canton and Macao Steamboat Company, Ld.	1865	$1,200,000	80,000	$15	$15	e $250,000 di $600,000 f $145,311	$24,080	31-12-05	$1 for second half-year 1905	16-2-06	8¼	$24½ sellers
Indo-China Steam Navigation Company, Ld.	1882	£1,200,000	(2) 60,000	£10	£10	£120,000 i £241,150 h £3,999	£4,435	31-12-04	12/- @ 1/10 ⅞=$6.29.51 for 1904	13-7-05	6½	$96
Shanghai Tug and Lighter Co., Ld. Do. Preference.	1903	Tls. 1,500,000	200,000 100,000	Tls. 50	Tls. 50	i Tls. 25,000	Tls. 43,762	31-12-04	Interim of Tls. 2. for 1905 Interim of Tls. 1¼ for 1905	28-8-05	7½ 7½	Tls. 60 buyers Tls. 50 buyers
"Shell" Transport & Trading Co., Ld.	1898	£2,000,000	2,000,000	£1	£1	£400,000 i £4,144	£7,815	31-12-04	1/- (Coupon No. 6) for 1905	1-1-06	4¼	24/6
"Star" Ferry Co., Ld.	1898 1900	$200,000	10,000 10,000	$10 $10	$10 $5	$65,000 i $24,257	$929	30-4-05	$1.80 90 cents for year ended 30-4-1905	29-5-05	5¾ 4	$32 buyers $23 buyers
Straits Steamship Co., Ld.	1890	$500,000	(3) 5,000	$100	$100	$400,000 e $21,075 i $130,153	$21,231	31-12-04	$10 for 1904	21-3-05	7	$147½ buyers
Taku Tug & Lighter Co., Ld.	—	T.T 1,500,000	30,000	T.Tls.50	T.Tls.50	Tls. 98,000 d Tls. 195,479 e Tls. 28,000 i Tls. 81,200	Tls. 4,333	31-12-04	Final of Tls. 2 making Tls. 4 for 1905	1-3-05	11	Tls. 36 ex. div.
Refineries.												
China Sugar Refining Company, Ld.	1878	$2,000,000	20,000	$100	$100	e $450,000 r $150,000	$42,812	31-12-04	Interim of $10 for 1905	18-8-05	10	$214
Luzon Sugar Refining Company, Ld.	1882	$700,000	7,000	$100	$100	none	$85,987	31-12-04	$3 for 1897	24-3-98	—	$37
Perak Sugar Cultivation Co., Ld.	—	Tls. 350,000	7,000	Tls. 50	Tls. 50	Tls. 100,000	Tls. 3,723	31-7-05	Tls. 2½ for year ending 30-9-1904	17-12-04	—	Tls. 72½ sales
Mining.												
Chinese Engineering & Mining Co., Ld.	1901	£1,000,000	1,000,000	£1	£1	d £80,000 h £12,289	£13,355	28-2-05	Final of 1/- (No. 5)	2-11-05	—	Tls. 10 buyers
Oriental Consolidated Mining Co., Ld.	1901	G.$5,000,000	y 500,000	G. $10	G. $10	none	G. $909,050	30-6-05	Final 50 cts. mak. G. $1 for 1005	21-12-05	—	G. $16
Raub Australian Gold Mining Co., Ld.	1892	£200,000	150,000 50,000	£1 £1	18/10 £1	£4,873	£8,745	31-3-05	No. 12 of 1/-=48 cents	28-1-01	—	$3½

STOCK	WHEN ESTAB-LISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation * PER CENT	CLOSING QUOTATIONS
Docks, Wharves and Godowns.												
Farnham (S. C.), Boyd & Co., Ld	1901	T5,520,000	55,200	T100	T100	T1,000,000	.........T34,924	30-4-05	Interim of Tls. 4 for year 1905-6.	6-1-06	9¼	T122½ sales
Fenwick (Geo.), & Company, Ld........	1889	$450,000	*z* 18,000	$25	$25	$70,000	.... $8,577	31-12-04	$3¾ on old capital for 1904..........	13-3-05	—	$23 sellers
Hongkong and Kowloon Wharf and Godown Co., Ld........................	1886	$2,000,000	40,000	$50	$50	$250 000 *d.r.* $58,423 *i* $10,000 *p* $300,000	.........$29,422	31-12-04	Interim of $2½ for 1905................	26-7-05	4¾	$107 sellers
Hongkong & Whampoa Dock Co., Ld.	1866	$2,500,000	50,000	$50	$50	*i* $49,500	........$362,323	31-12-05	$6 for second half year '05	27-2-06	8	$156 ex div.
New Amoy Dock Co., Ld...................	1892	$67,500	10,000	$6¾	$6¾	$55,500	—	31-12-05	$1 for 1905..................................	1-3-06	7	$16 ex div.
Shanghai and Hongkew Wharf Co. Lt.	1902	T3,200,000	32,000	T100	T100	*b* T487,210 *r* T59,880	.........T10,711	31-12-04	Interim of T6 for 1905.................	23-8-05	5¼	T225 sellers
Vulcan Ironworks, Ltd.	1905	T500,000	1,000	T500	T375	—	—	—	First year..................................	—	—	T375 buyers
Yangtsze Wharf and Godown Co., Ld..	1902	T250,000	2,500	T100	T100	T17,500	.........T2,762	31-12-04	T18 for 1904..................................	29-3-05	8¼	T215 buyers
Lands, Hotels and Buildings.												
Anglo-French Land Investment Company, Ltd..................................	1906	T2,500,000	*(3)* 25,000	T100	T100	—	—	—	First year	—	—	T100
Astor House Hotel Co., Ltd.	1901	$750,000	*(4)* 30,000	$25	$25	$14,156	..........$9,028	30-6-05	$2½ for year ending 30-6-1905	19-8-05	9	$27 buyers
Astor House Hotel, Ld. (Tientsin)	—	TT100,000	2,000	T. T50	T. T50	*e* T34,000 T8,000	.... T806	29-2-05	Interim of T5.....	21-10-05	8	T130 buyers
Central Stores, Ld............................	—	$91,845	6,000	$15	$12	$20,000	.........$1,502	31-12-04	Final of 60 cents making $1.80 for '04..	30-3-05	12	$15
Do. (Founders')............			123	$15	$12				None........	—	—	$100
									Preferential of 7°/₀ for '04............	30-3-05	7	$7½
Do. (NewIssue)...............	1904	$360,000	24,000	$15	$7½	$648,975 *r* $31,087	.........$10,126	30-6-05	$5 for first half-year 1905..............	4-9-05	6¾	$140
Hongkong Hotel Co., Ld.	1866	$600,000	12,000	$50	$50	*e* $250,000	........$67,839	31-12-05	Final of $3½ making $7 for 1905....	2-2-06	6	$115
Hongkong Land Investment and Agency Co., Ld.	1889	$5,000,000	50,000	$100	$100	*n* T20,986	........T7,202	31-3-05	Interim of T1................................	1-11-05	14	T17 buyers
Hotel des Colonies Co., Ld. (Shanghai)	1902	T225,000	9,000	T25	T25	none	.........$4,699	30-6-05	Final of $6 making $10 for the year.	26-7-05	10	$100
Hotel Metropole Company, Limited	1904	$200,000	2,000	$100	$100	*i* $208,386 *e* $50,000	.........$5,070	31-12-05	80 cents for 1905.........................	12-2-06	7	$11¾
Humphreys' Estate & Finance Co., Ld.	1887	$1,500,000	150,000	$10	$10	none	............$574	31-12-05	$2½ for 1905................................	7-2-06	7	$35
Kowloon Land and Building Co., Ld. ..	1889	$300,000	6,000	$50	$30	T909,593 *e* T170,000	.........$52,194	31-12-05	Final of Tls. 3 making T6 for 1905	23-2-06	5¼	T112 buyers
Shanghai Land Investment Co., Ld......	1901	T2,600,000	52,000	T50	T50	none	.... T474	31-12-05	Final of Tls. 2½ making Tls.5 for '05	20-2-06	12¾	T42½ ex div.
Tientsin Hotel des Colonies, Ld.	1903	T70,000	1,400	T50	T50	*i* T67,300	.... T725	31-12-04	Final of Tls. 5 making Tls. 8 for '05	24-2-06	7¼	T110 ex div.
Tientsin Land Investment Co., Ld.......	1902	T772,600	7,726	T100	T100	none	.... $772	31-12-05	Final of $1.90 making $3.65 for '05	2-2-06	7	$53
West Point Building Co., Ld.	1889	$625,000	12,500	$50	$50							
Cotton Mills.												
Ewo Cotton Spinning and Weaving Co., Ld.	1895	T1,000,000	*(5)* 20,000	T50	T50	T45,939	.......T100,000	31-10-05	T8 for year ended 31-10-1905..........	18-12-05	13½	T59 buyers
Hongkong Cotton Spinning, Weaving and Dyeing Co., Ld..................	1901	$1,250,000	125,000	$10	$10	*e* $30,000	.........$23,264	31-7-05	$1 for year ended 31-7-1905...........	4-9-05	6¾	$15 buyers
International Cotton Manufacturing Co., Ld.	1895	T750,000	*(6)* 10,000	T75	T75	T100,000	.........T18,718	30-9-05	Interim of 3 % a/c 1898..................	30-4-98	—	T60 sales
Laou-kung-mow Cotton Spinning & Weaving Co., Ld.	1895	T800,000	*(7)* 8,000	T100	T100	none	.........T30,760	31-12-05	Tls. 8 for 1905	21-2-06	12	T67 sales
Soey Chee Cotton Spinning Co., Ld.....	1895	T1,000,000	2,000	$500	T500	T5,658	.........T22,051	31-12-04	4 °/₀ for 1895..............................	2-2-88	—	T275 buyers
Miscellaneous.												
Anglo German Brewing Co., Ltd.	1904	$100,000	4,000	$100	$100	none	.... $1,066	31-12-05	$7 for 1905	1-3-06	7½	$93 ex div.
Bell's Asbestos Eastern Agency, Ld......	1895	£5,377.10s	8,604	12/6	12/6	£314	............£770	31-12-04	1s. 3d per share for 1904.................	21-7-05	9	$7 buyers
Campbell, Moore & Co., Ld................	1886	$12,000	1,200	$10	$10	$8,000	..........$1,182	31-12-04	$3 for 1904	1-4-05	8¼	$36
China-Borneo Co., Ld........................	1903	$720,000	*(8)* 60,000	$12	$12	none	—	31-12-04	$1 for 1904	17-3-05	10	$10 sellers
China Flour Mill Co., Ld.	—	T200,000	4,000	T50	T50	T30,000	............T718	31-12-04	Interim of T5 for 1905	24-7-05	—	T87½ buyers
China Light and Power Co., Ld.	1901	$500,000	50,000	$10	$10	none	..........$3,739	29-2-04	None..	—	—	$ 10
China Provident Loan and Mortgage Co., Ld.	1898	*a* $1,000,000	100,000	$10	$10	$10,000	..........$4,791	31-12-05	80 cents for 1905..........................	22-1-06	9	$9 sales
Dairy Farm Company, Ld..................	1896	$187,500	25,000	$7½	$6	$25,000	..........$2,864	31-7-05	$1.20 for year ending 31-7-1905	24-11-05	7¾	$15½ buyers

STOCK	WHEN ESTAB-LISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation* PER CENT	CLOSING QUOTATIONS
Miscellaneous.—Continued												
Green Island Cement Co., Ld.	1889	$1,500,000	150,000	$10	$10	p $410,000 $500,000	$52,291	31-12-05	$2 div. & 50 cents bonus for '05	26-2-06	6¼	$30 ex div. & b.
Hall & Holtz, Ld.	—	$420,000	21,000	$20	$20	$186,000	$7,551	29-2-05	Final of $1½ making $2½	15-4-05	10	$25 sales
Hongkong Electric Co., Ld.	1889 1899	$600,000	30,000 30,000	$10 $10	$10 $10	none	$2,151	30-4-05	$1 00 / 50 cents } for year ending 30-4-05	17-7-05	6 —	$16½ buyers $16
Hongkong High-Level Tramways Co., Ld.	1887	$125,000	1,250	$100	$100	$50,000	$2,796	30-11-04	$15 for year ending 30-11-04	24-12-04	7	$215 buyers
Hongkong Ice Company, Ld.	1881	$125,000	5,000	$25	$25	k $80,000	$3,776	31-12-05	Final of $15 making $19 for 1905	16-2-06	8	$235
H'kong Rope Manufacturing Co., Ld.	1883	$500,000	10,000	$50	$50	$60,000	$11,173	31-12-04	$10 for 1904	10-4-05	7	$152 buyers
Hongkong Steam Waterboat Co., Ld.	1900	$150,000	15,000	$10	$10	$2,500	$88	30-9-05	Final of 50 cents making $1 for year ended 30-9-1905	24-11-05	10	$10 sales
Lane, Crawford & Co., Ld. (Shanghai)	1903	$250,000	2,500	$100	$100	none	$42,009	29-2-05	Interim of $5	20-11-05	9½	$145 buyers
Maatschappij tot Mijn-, Bosch-en Landbouwexploitatie in Langkat	1902	Gs.2,500,000	25,000	G.100	G.100	i T528,210 T19,465	T35,849	31-10-04	4th quarterly dividend of T7½ making in all T22½ for '05	15-12-05	9½	T232½ sales
Mondon, (E. L.) Ld.	1902	T350,000	7,000	T50	T50	none	*Dr.* T117,638	31-12-04	T5 for 1902	2-5-03	—	T25
Philippine Company, Ld.	1904	$675,000	67,500	$10	$10	none	*Dr.* P53,619	31-12-04	None	—	—	$5¼ buyers
Shanghai and Hongkong Dyeing and Cleaning Co., Ld.	1903	$60,000	1,200	$50	$50	none	*Dr.* $16,455	31-8-05	None	—	—	$50
Shanghai Gas Co., Ld.	1903	T800,000	16,000	T50	T50	d T145,000 T108,172	T8,011	31-12-04	Interim of T3½ for 1905	26-7-05	7	T130 buyers
Shanghai Horse Bazaar Co., Ld.	1904	T270,000	5,400	T50	T50	T45,000	T9,751	31-12-04	T6 for 1904	17-3-05	9	T67½ sales
Shanghai Pulp and Paper Co., Ld.	—	T450,000	4,500	T100	T100	e T37,000 T8,000	T2,753	31-12-04	Final of T8 making T14 for 1905	27-2-06	9	T157 ex div.
Shanghai Sumatra Tobacco Co., Ld.	1902	T600,000	(9) 30,000	T20	T20	w T24,820 T25,000	T1,297	31-10-04	Interim of T2	20-10-05	—	T60 sellers
Shanghai Waterworks Co., Ld.	1881	£288,000	7,200 7,200	£20 £20	£20 £5	T170,000	T17,220	31-12-04	Interim of 15/- for 1905 First year	27-7-05 —	— —	T510 cum new T170 buyers
South China Morning Post, Ld.	1903	$150,000	6,000	$25	$25	none	*Dr.* $5,068	29-2-05	None	—	—	$20 sellers
Steam Laundry Co., Ld.	1902	$100,000	20,000	$5	$5	none	$1,134	31-5-05	50 cents for year ended 31-5-05	20-11-05	8¼	$6
Straits Ice Company, Ld.	1884	$200,000	2,000	$100	$100	$25,000	$700	31-12-04	$5 account 1905	...-2-05	—	$160 buyers
Tientsin Waterworks Co., Ld.	1901	T. T200,000	2,000	T. T100	T. T100	e T15,259 T4,000	T1,012	30-4-05	Final of T4½ making T8½ for '04/5	17-6-05	7¾	T. T110
United Asbestos Oriental Agency, Ld. Do. do (Founders')	1896	$100,000	9,900 100	$10 $10	$4 $10	$22,000	$551	31-5-05	80 cents / $19.80 } for year ended 31-5-05	29-7-05	9 11	$9 $180
Watson (A. S.) & Co, Ld.	1886	$900,000	90,000	$10	$10	$300,000 $25,000	$6,096	31-12-04	Interim of 50 cents for 1905	25-11-05	7¾	$13 buyers
William Powell, Ld.	1901	$150,000	15,000	$10	$10	e $4,500	$676	30-6-05	Final of 70 cents making $1.20 for year ended 30-6-05	2-10-05	10½	$11¼

LOANS AND DEBENTURES	AGENTS FOR THE LOAN	AMOUNT OF LOAN	PAR VALUE	OUT-STAND'G BONDS	WHEN PAYABLE	CLOSING QUOTATIONS
China Government, 7 per cent. Silver Loan 1886 E.	Hongkong & Shanghai Bkg. Cor.	T767,200	T250	1914	Mar. 31st & Sept. 30th each year until Mar. 31st, 1917.	par.
Hongkong Hotel Co., Ltd., 6% Mortgage Debentures of 1899‡	Hongkong & Shanghai Bkg. Cor.	$500,000	$500	§ all	Half yearly, June 30th and December 31st	par.
Shanghai & Hongkew Wharf Company, Ltd. 6% Debentures of 1902	Hongkong & Shanghai Bkg. Cor.	T543,900	T100		Half yearly, June 30th and December 31st	T97
Astor House Hotel Co., Ltd. 8% Debentures of 1903	Hongkong & Shanghai Bkg. Cor.	T500,000	T100		Half yearly, January 1st and July 1st	T104
Chinese Engineering & Mining Co., Ltd., 6% Debentures of 1903†		£500,000	¶	£431,960	Half yearly, June 30th and December 31st	par.
International Cotton Manufacturing Co., Ltd. 6% Debentures of 1901	Russo Chin. Bk.	T500,000	T100	‖	Half yearly, March 31st and September 30th	par.

(Closing quotations: Plus accrued interest)

a Auhorized capital $2,000,000
b Building Reserve Account.
c Capital Reserve Fund.
d Depreciation Fund.
e Equalization of Dividend Fund.
f Exchange and Investment Fluctuation Account.
g Gold Reserve Fund
h Exchange Reserve Account.
i Insurance Fund.
j Reinsurance Fund.
k Contingencies Account.
l Legal Reserve Fund.
m
n Sinking Fund.
o
p Premium on New Issue.
q
r Repairs and Renewals Account.
s Silver Reserve Fund.
t
u Underwriting Suspense Account.
v
w Special Works Funds.
x Extra Reserve Fund.
y 75,000 owned by the Company
z 6,000 shares unissued.
1 5,725 shares unissued.
2 First issue of 60,000 of which 10,411 unalloted.
3 5,000 shares unissued.
4 7,600 shares unissued.
5 5 000 shares unalloted.
6 1,616 shares unalloted.
7 842 shares unissued.
8 14,000 shares unissued.
9 17,000 shares unissued.
* Based on last year's dividend.
‖ Only Tls. 134,000 taken up.
§ 216 held by the Company
¶ In certificates of £20 and £100
‡ Redeemable in 10 years, or at option of Company the Company giving 6 months' notice.
† Redeemable at par at rate of £10,000 per annum from 31st December,
Dr. Deficit.

COURTESY MESSRS. FRASER & CO., BROKERS, SINGAPORE, MARCH, 1906.

NAME	DATE OF FORMATION	CAPITAL	CAPITAL PAID UP	NO. OF SHARES	ISSUE VALUE	PAID UP	RESERVE	LAST DIVIDEND	SINCE LAST MAIL HIGHEST	SINCE LAST MAIL LOWEST	CLOSING QUOTATIONS
									$	$	$
Mining.											
Bersawah Gold Mining Co., Ltd.	1900	$175,000	140,000	10,000 *1*	10	10			14.50	14.00	14.00 sellers
" " " " " *Deferred.*				4,000	10	10					8.00 sellers
Brunseh Hydraulic Tin Mining Co., Ltd.	1901	$600,000	600,000	60,000	10	10			9 50	9.00	9.50 sales
Kadana Gold Mining Co., Ltd.	1901	$300,000	300,000	20,000	10	10					2.00 sellers
" " " " " *Pref.*				10,000	10	10					10.00 nominal
Kechau Goldfields, Ltd. *Fully paid*	1902	£30,000	16,175.7/-	6,207	1	1					in liquidation
" " " *Contrib.*				10,493 *2*	1	19/-					in liquidation
Kuantan Tin Mining Co., Ltd.	1905	$150,000	99,000	9,900 *3*	10	10					12.50 buyers
Pahang Corporation, Ltd.	1889	£250,000	244,306	244,306 *4*	1	1	20,000	3% for year ending 30-6-02			1.25 sales & buyers
Pahang Kabang, Ltd.	1890	£375,000	375,000	360,000	1	1			0.25	0.20	0.20 sales & buyers
" " " *Pref.*				15,000	1	1					...... nom.
Queensland Raub G. M. Co., Ltd. *Fully paid*	1901	£146,700	100,866	36,700	1	1					...... nom.
" " " " *Contrib.*				110,000	1	11/8					...... nom.
Raub Aust. Gold Ming. Co., Ltd. *Fully paid*	1892	£200,000	191,250	50,000	1	1	4,873	1s. paid January, '01			2.00 sellers
" " " " *Contrib.*				150,000	1	18/10		1s. " " "			2.00 sellers
Redjang Lebong Mining Co.	1898	f.2,000,000	1,800,000	18,000 *5*	100	100		22 9-10% for year ending 31-12-04			385 00 sales
Royal Johore Tin Mining Co., Ltd.	1900	$220,000	220.000	22,000	10	10		5 " for year ending 15-2-04			3.00 sellers
Sipiau Tin Co., Ltd.	1899	$230,000	230,000	23,000	10	10		5 " for ½ year ending 30-6-05			7.00 sales & sellers
The Belat Tin Mining Co., Ltd.	1903	$300,000	300,000	30,000	10	10					3.00 sellers
The Pusing Lama Tin Mines, Ltd.	1904	£120,000	98,000	98,000 *6*	1	1		6d. paid February, 1906			10.80 sellers
Tronoh Mines, Ltd.	1902	£160,000	149,185	149,185 *7*	1	1		7s. paid during 1905			17.50 sales
Duff Development Co., Ltd.	1903	£400,000	350,000	350,000 *8*	1	1					7.00 sellers
Rubber.											
Anglo-Malay Rubber Co., Ltd.	1905	£150,000	140,000	140,000 *9*	1	1					£1 12s 6d
Balgownie Rubber Estate Ltd.	1905	$200,000	100,000	20,000	10	5			11.50	10.50	$11.50 sales
Batu Caves Rubber Co. Ltd. *Fully paid*	1904	£30,000	11,125	7,000 *10*	1	1					......
" " " " *Contrib.*				11,000	1	7/6					£1 0s od.
Bukit Rajah Rubber Co. Ltd *Fully paid*	1903	£70,000	59,250	54,000 *11*	1	1					£3 15s. od.
" " " " *Contrib.*				7,000	1	15/-					£3 10s. od.
Cicely Rubber Estates Co.. Ltd.	1904	£12,000	10,500	6,000	1	1					£2 5s. od.
" " " 5% Pref.				6,000	1	15/-					£2 5s. od.
Consolidated Malay Rubber Estates, Ltd.	1905	£75,000	55,000	55,000 *12*	1	1					£1 17s. 6d.
Sione Rubber Company, Ltd.	1905	$100,000	88,000	8,800 *13*	10	10					$18.00
Sungei Way (Selangor) Rubber Co., Ltd.	1904	£50,000	15,670	6,920 *14*	1	1					£2 0s. od. buyers
" " " " *Contrib.*				35,000	1	5/-					£1 4s. od.
The Batu Unjor Rubber Co., Ltd.	1905	$700,000	610,000	61,000 *15*	10	10			24.00	22.00	$22.00 sales & sellers
The Pataling Rubber Estates Syndicate Ltd.	1903	£30,000	20,000	20,000 *16*	1	1					£5 0s. od. buyers
The Ribu Planting Co., Ltd.	1904	$200,000	135,000	1,350 *17*	100	100					$270.00
The Sandycroft Rubber Co. Ltd.	1904	$100,000	85,000	850 *18*	100	100					$245.00 sales
The Selangor Rubber Co., Ltd.	1898	£30,000	26,300	26,300 *19*	1	1					£7 15s. od.
The Singapore & Johore Rubber Co., Ltd.	1903	$100,000	91,500	150	100	100					$185.00
" " " " " " *Contrib*				850	100	90					$175.00
Vallambrosa Rubber Co., Ltd.	1904	£60,000	50,000	50,000 *20*	1	1					£5 0s. od.
General.											
Fraser & Neave, Ltd.	1898	$225,000	225,000	4,500	50	50	112,500	10 p. ct. and 2½ per cent bonus for '04	105.00	104.00	105.00 sales
Hogan & Co., Ltd.	1904	$480,200	334,800	3,348 *21*	100	100	5,000	7 per cent for 1904			40.00 sellers
H'kong and Shanghai Banking Corporation	1865	$10,000,000	10,000,000	80,000	125	125	10,000,000 *25* 9,500,000 *26* 250,000 *27*	35s. and 20/- bonus for ½ year ending 31-12-05			800.00 buyers
Howarth Erskine, Ltd.	1901	$2,400,000	18,000	100	100				135.00	130.00	135.00 buyers
" " " 7% Pref.			6,000	100	100						110.00 buyers
Maynard & Co., Ltd.	1901	$34,000	34,000	3,400	10	10		15 p. ct. for year ending 31-10-05			23.00 sellers
Riley, Hargreaves & Co., Ltd.	1899	$875,000	875,000	6,000	100	100	150,000	10 p. ct. and 2½ p. ct. bon. for year '04			190.00 sales
" " " " 7% Pref.				2,750	100	100		7 p. ct. for year 1904			115.00 buyers.
Singapore Cold Storage Co., Ltd.	1903	$600,000	240,000	24,000 *22*	10	10			10.00	9.00	9.00 sales
Singapore Dispensary Ltd.	1891	$30,000	30,000	600	50	50	19,000	12½ per cent for year ending 31-7-04			70.00 sellers
Straits Ice Co., Ltd.	1884	$200,000	200.000	2,000	100	100	22,000	5 " interim for 1905			150.00 buyers
Straits Steam Ship Co., Ltd.	1890	$500,000	421,500	5,000 *23*	100	100	400,000 169.228 *28*	5 p. ct. interim for 1905			145.00 sales & buyers
Straits Trading Co., Ltd.	1887	$3,000,000	2,500,000	250,000 *24*	10	10	700,000 1,021,395 *29*	10 p. ct. & 5 p. ct. bon. ½ yr. end. 30-9-05	43.25	43.00	43.25 sales
Tanjong Pagar Dock Co., Ltd.	1864	$3,700,000	3,700,000	37,000	100	100	1,950,000	$6 for half year ending 31-12-05			500.00 sales
Debentures. $											
Howarth Erskine Ltd. 6 per cent ... 600,000											3 per ct. prem. buyers
Singapore Municipal 6 " ... 400,000											3 ,, prem. buyers
" " 5 " ...1,878,000											par buyers
" " 4 " ... 602,300											2 per ct. dis. nominal
Riley, Hargreaves & Co., Ld. 6 p. cent 225,000											2 ,, prem. buyers
Tanjong Pagar Dock Co., Ld. 6 " 250,000											2 ,, prem. buyers
" " " " 5 " 1,365,500											par buyers

1 3,500 unissued.
2 13,300 "
3 5,100 "
4 5,694 "
6 22.000 unissued
7 10,815 "
8 50,000 "
9 10,000 "
11 9,000 unissued
12 20,000 "
13 1,200 "
14 8,080 "
16 10.000 unissued Mort. £5,000
17 650 "
18 150 "
19 3,700 "
21 1,454 unissued.
22 36,000 "
23 785 "
24 50,000 "
26 Silver Reserve Fund.
27 Insurance Fund.
28 Sundry Reserves.
29 Sundry Reserves.

YOKOHAMA SHARE QUOTATIONS

Courtesy A. C. Hutton Potts, Share and General Broker, Yokohama, December, 1905.

STOCKS.	CAPITAL.	NO. OF SHARES.	ISSUE VALUE.	AMOUNT PAID UP.	RESERVE FUND.	AT WORKING ACCOUNT OR CARRIED FORWARD.	DATE.	LAST DIVIDEND.	FOR TERM.	CLOSING QUOTATION.
	Y.		Y.	Y.						
Brett & Co., Limited	28,000	2800	10	10			30/6/03	6%	for 1 year	7 Nominal.
Club Hotel, Limited	185,000	1850	100	100			31/3/04	7%	,, 1 year	55 Buyers.
Grand Hotel, Limited	250,000	2500	100	100		Y.6,179.25	31/12/05	10%	,, ½ year	225 Sellers.
Helm Bros., Limited	186,000	3720	50	50		Y.6,235.70	31/12/05	17½%	,, 1 year	80 Buyers.
Langfeldt & Co., Limited	150,000	1500	100	100		Dr.28,875.52	31/12/05		,, ½ year	45 Selles.
C. Nickel & Co., Limited	500,000	20000	25	25		5,106.41	31/10/05	12%	,, 1 year	35 Nominal.
Japan Brewery Company, Limited	450,000	9000	50	50	200,000	8,702.28	31/12/05	20%	,, 1 year	120 Buyers.
Yokohama Engine and Iron Works	130,000	2600	50	50	20,000	Y.20,149.17	30/11/05	10%	,, ½ year	120 Sellers.
Hirano Mineral Water Co., Ltd	125,000	5000	25	25				1st year		25 Sellers.
Oriental Hotel, Ltd., Old Ordinary		1490	50	50			31/8/05	12%	,, 1 year	75 Nominal.
,, ,, New ,,		1510	50	25						
,, ,, Old Preference	251,000	750	50	50	60,542.50			8%	,, 1 year	63 Sales.
,, ,, New ,,		1250	50	25						
,, ,, Founders	G	80	12½	12½				Y.37	,, 1 year	500 Sales.
Oriental Consolidated Mining Co., Ltd	$5,000,000	500,000	G.$10	G. $10	none	G. $672,093	31/12/04	G. $1.	,, 1905	G. $18 Sellers.
Raub Australian Gold Mining Co., Ltd	£200,000	150,000	£1	18/10						
		50,000	£1	£1	£4,873	*Dr.* £8,745	31/3/05	48 cts.	,, 1901	$5.10 Sales.

DEBENTURE LOANS.	AMOUNT OF LOAN.	FACE VALUE OF DEBENTURES.	RATE OF INTEREST.	INTEREST PAYABLE.	CLOSING QUOTATION.
Japan Brewery Company, Limited	200,000.00	100.00	7%	1 April and 1 October.	108 Sales.
Brett and Company, Limited	11,500.00	100.00	7%	1 June and 1 Dec.	95 Sellers.
Yokohama United Club	250,000.00	100.00	7%	30 June and 31 Dec.	108 Sales.
C. Nickel and Company, Limited	50,000.00	100.00	8%	1 May and 1 Nov.	110 Sellers.

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THE FAR EASTERN REVIEW
COMMERCE ENGINEERING FINANCE

VOL. II. MANILA, P. I., SHANGHAI, AND YOKOHAMA, APRIL, 1906. No. 11.

COAL DEPOSITS OF THE ISLAND OF BATAN, PROVINCE OF ALBAY, SE. LUZON, P. I

There has just been issued by Mr. H. D. McCaskey, head of the Mining Division of the Bureau of Science, Manila, an exhaustive report on the coal deposits of Batan Island, with notes on the general and economic geology of the adjacent region. The bulletin was prepared by Mr. Warren D. Smith, B. S., M. A., a geologist in the government service, and is regarded as a most important exposition of the subject in view of the fact that the federal government at Washington, with authority of congress, is negotiating for the purchase of that section of the island in which the deposits are located. In this purchase will be included all that land owned by private parties in which the most promising claims are located, together with a large tract surrounding them. The intention of the government is to declare these lands a military reservation and either develop the coal deposits on its own hook or permit the work to be done with private capital, if persons can be induced to take of the industry. The government hopes to be able to supply all vessels of the navy in these waters as well as the steamers in the insular service with coal from these fields, and the military as well; besides furnish the merchant marine with fuel.

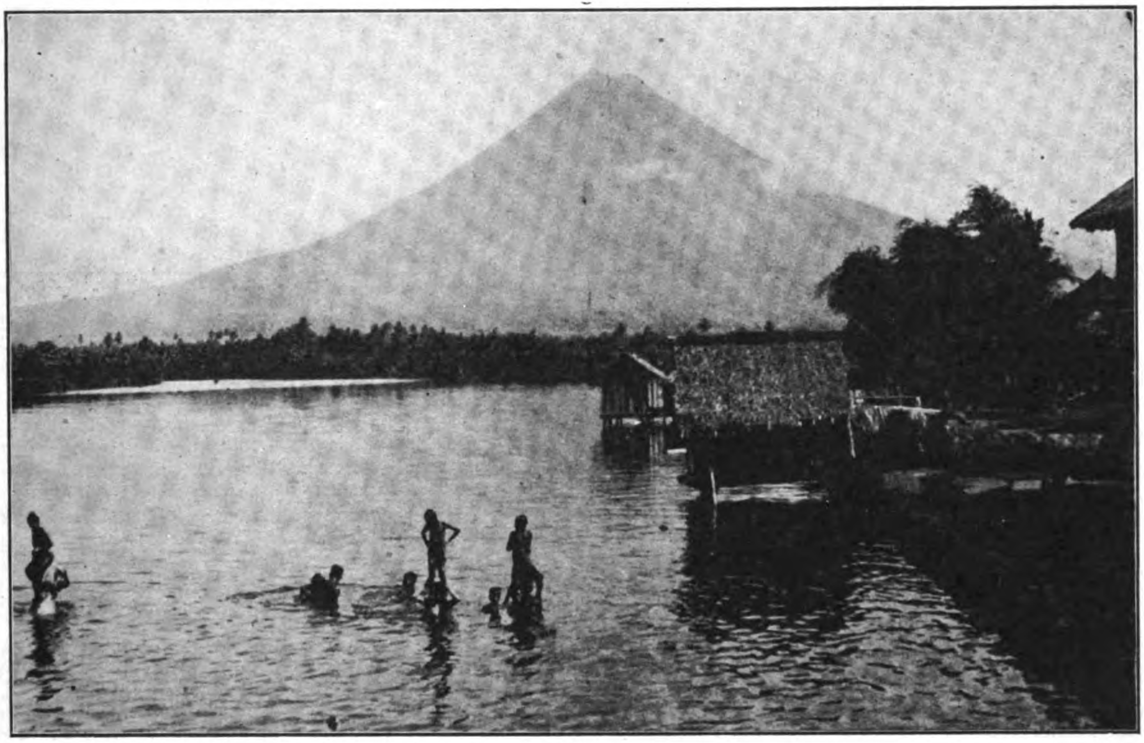
GEOLOGY.—The Island of Batan lies slightly NE. of Legaspi about 12 ms. and is bounded on the W. by Cacraray Island, on the E. by Rapurapu Island, is due E. of Mayon Volcano, is bisected by the 124th meridian, and lies 13° 10′ and 13° 20′ N. latitude. Its area is about 45 sq. ms. The island is coral grit, but there are breaks in the reef so that ocean-going vessels can come close in, as at Cold Harbor, between Cacraray and Batan, within 100 yds. of shore. Launches drawing 6 to 10′ can pass around three-fourths of the island. The best harbor facilities at Batan, and, for that matter, anywhere along the E. coast of Luzon for 100 ms. are those at Liguan on the W. end of the island. Here an anchorage perfectly sheltered from any heavy winds can be obtained in 17 fathoms with a mud bottom, and this within the limit to which it would be feasible to erect a dock. The average tide amounts to about 3′, but gets as high as 7′ to 8′ in the spring and at the time of full moon.

VEGETATION.—At first sight Batan Island seems to be vegetation and nothing else, and when one sets out to trace outcrops he is not quickly disillusioned. From the shore or the sea scarcely an outcrop can be seen, so thick is the undergrowth. The principal trees are red narra, some of which reach a height of 150′; molave, doa, and bejuco on the higher ground; in swampy estuaries bacauan and bacagua. On the E. ridge, from Calanaga Bay to East Point, which is underlain by volcanic rock, a few scattered jack pines—tapulao—are to be seen. With the exception of this ridge the undergrowth is exceptionally thick, requiring the continued employment of bolomen. The red narra affords all the material for mine timbering and buildings that will ever be required.

HYDROGRAPHY.—Very little can be said in favor of the water supply of the island. There is no running water to speak of in any stream of the island. As a result of his exploratory work, Lieutenant H. L. Wigmore, Corps of Engineers, U. S. Army, estimates that by means of properly constructed reservoirs and weirs about 120,000 galls. of water could be supplied from the various streams per day. For drilling purposes he has had to pump, or haul by carabaos, water from sea level. This constituted one of the chief items of expense in the work carried on by Lieutenant Wigmore. The small size of the island and comparatively low elevation mean lack of large feeding areas for streams; this, coupled with the broken and porous nature of the lime stone formations, militates against the collection into any one large watercourse of a great quantity of water. This will be one of the drawbacks to exploratory work with diamond drills in this area.

TOPOGRAPHY AND PHYSIOGRAPHY.—Topographically Batan Island is quite rugged and broken, and for its size appears to be very mountainous, though none of the elevations rise more than 1,400′. As a whole the island is practically a monocline, with alternating hard and soft strata, and the effect on the streams is to produce monoclinal shifting to the N. The effect produced by

(Continued on page 304.)



MAYON VOLCANO FROM LEGASPI, PROVINCE OF ALBAY, P. I.

THE FAR EASTERN REVIEW

GEO. BRONSON REA, M. E.

PUBLISHER AND EDITOR

COMMERCE :-: ENGINEERING :-: FINANCE

A MONTHLY REVIEW OF FAR EASTERN TRADE, FINANCE, AND ENGINEERING. DEDICATED TO THE INDUSTRIAL DEVELOPMENT AND ADVANCEMENT OF TRADE IN THE PHILIPPINES AND FAR EASTERN COUNTRIES.

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MANILA, SHANGHAI, AND YOKOHAMA, APRIL 1906

INDUSTRIAL DEVELOPMENT OF THE PHILIPPINES

In his inaugural address, Governor-General Henry C. Ide referred to the tariff and spoke of the important part railways are destined to take in the future commercial and industrial development of the Philippines. His remarks on these subjects were to the point and should be of absorbing interest to every person who is interested in the Islands. They follow:

The Dingley Tariff.—The ability, however, faithfully to perform the entire duty of the American people towards the Philippine Islands does not rest wholly with any administration, either here or in the United States, but is in considerable part dependent upon the action of Congress. One of the present great needs of the Islands is a better market for its products, and that better market we seek by lowering or breaking down the tariff barriers that exist between the home country and the Islands. Whether in this respect we succeed now or not, such success is only a question of time. We have not merely the mighty influence of the president and the secretary of war strenuously striving in that behalf, but we have back of us the hearts of the American people. The house of representatives, fresh from the people and responsible to them, has passed the modified tariff law in accordance with the interests of the Filipino people, by the tremendous vote of 257 to 71. This shows how the heart of the American people beats. With the president and his whole cabinet, the American people, the house of representatives, and justice on our side, the right will prevail; if not to-day, then to-morrow, and that to-morrow is not far away.

Transportation.—Intimately connected with subject of the tariff, as affecting our industrial development, lies the question of better transportation facilities within the Islands themselves. It is of little avail, aside from supplying immediate wants, that cultivators have soil capable of producing large crops of valuable commodities if the whole value of such products is to be consumed in transporting them to any market, local or foreign. Such always has been the condition in some of the most fruitful portions of these beautiful Islands Local capital is not available for the construction of railroads. Aside from the poverty of the great mass of the Filipino people, they have been subjected to the fearful disasters of pestilence that has destroyed many lives; contagious diseases that have swept away a large percentage of their beasts of burden; attacks of voracious insects that have devoured their crops; disastrous storms that have prostrated their fruit-trees and dwellings; internal dissensions, war, and predatory bands that have destroyed millions of dollars of valuable property and caused the death of many who ought to have been useful citizens and producers. Under such circumstances the need of capital from abroad is tremendous. Foreign capital has hesitated to enter the Islands because of uncertainty as to conditions here and because of the highly profitable use to which it could be devoted in the United States and other parts of the world, yet marked progress has already been made The City of Manila now has a complete system of 40 ms. or more of well-equipped street railway, which increase the values of all suburban property and diminishes the expense of living for multitudes of people. Contracts have already been entered into for the construction of 255 ms. of railroads in the islands of Cebu, Negros and Panay, under a guarantee by the government of interest at a rate not exceeding 4 per cent for a limited time upon the bonds to be issued, the proceeds of which are to be devoted exclusively to the construction and equipment of the railroads, and the moneys advanced by the government in pursuance of its guarantee to be ultimately returned to it, the amount thereof to be a lien upon the property of the roads. These contracts will do much to develop the Visayan Islands, and it is confidently believed that they will soon demonstrate their profitableness so that the parties who have taken these contracts, or others, will cover the Visayan Islands with railroads wherever such enterprises are needed. Negotiations, also, are well under way, and which it is hoped will be consummated in the near future, whereby the great Island of Luzon may have its resources opened up and its transportation facilities enormously increased without imposing any unreasonable burdens upon the people. Franchises for such enterprises should be carefully guarded so that no undue burdens may rest upon the people, and so that they may be properly controlled and prevented from becoming the masters instead of the servants of the people; yet every privilege should be granted that is consistent with security to the public and protection of its rights, both for the present and for the distant future. If we fail to get immediately all the railroads that we had hoped for, yet it is to be remembered that a railroad develops a country and opens up beyond its terminus lands hitherto unavailable and tempts settlers to occupy them. Self-interest will induce the owners of railroads to push on and still on into additional territory until all needed facilities are provided. The increased agricultural development that has followed the extension of the Manila & Dagupan Railway to Cabanatuan, in the Province of Nueva Ecija, has shown almost instantaneously what we may expect in other parts of the Islands. Added railways mean added land under cultivation, added value to land near the railroads, added productions for domestic consumption and for export, added demand for labor, added prosperity for the whole country.

The foregoing extracts are the pith of the problem which confronts the economic government of the Philippine Islands, and upon which depends our future. The governor-general had much more of interest to say in his address, particularly with reference to prospective legislation, but we think none of his remarks were so important to the country-at-large as those which we have quoted.

And the governor-general knows whereof he speaks. His long official residence in the Islands has afforded him a splendid opportunity to observe and study conditions throughout the archipelago. The conclusions he has reached are practical, the natural result of a thoroughly-considered problem. Therefore, we know of no man in public or private life who is better qualified to discuss the needs of the country and recommend remedies for the betterment of conditions than the new chief executive.

Judge Ide knows absolutely what this country needs to insure its development and prosperity. It is favorable tariff laws, transportation facilities, and peace and harmony among the people. He pins his faith in the ultimate success of American endeavor out here to the *fair play* of the people at home in the matter of the tariff, and the importation of foreign capital to help the Filipinos develop the latent resources of the Islands. To prove the good intentions of the American people towards these unique Oriental people he cites with becoming pride and enthusiasm the tremendous vote in the lower house of congress in favor of tariff reduction. But there the governor-general must branch off into generalities, because he can not find in the makeup of the senate the same honest representation of the people that characterizes the house of representatives. We regret the presence of this stumbling-block to our olden-day delusion about the senate, because until maturer years and experience taught us otherwise we always believed the senate of the United States to be the most sedate, conservative, fair-minded, liberty-loving, and incorruptible legislative body in the world. Of late, however, we have been forced to regard the senators (or most of them, at least) as our natural enemies.

The governor-general also finds, in spite of the apparent inclination of certain legislators to keep us down, abundant satisfaction in the new era of railway building in the Islands. He shows us that with railways we can accomplish wonders for the country, and in this we are congratulated. The railways will give us transportation facilities so much needed at the present, and with this transportation we will be able to bring to market our agricultural, forestry, and mineral wealth; there will be an impetus to industry of all kinds, and in the near future following their installation the provinces will recover from their present impoverished condition.

With Governor-General Ide at the head of the government we may look for a very popular administration, the underlying principles of which will be progress, industrial development, and prosperity. Our only regret is that Judge Ide's tenure of office promises to be all too short. We should like to have him remain with us long enough to see with his own eyes the beneficial results that are to come in time from the able administration he surely will give us.

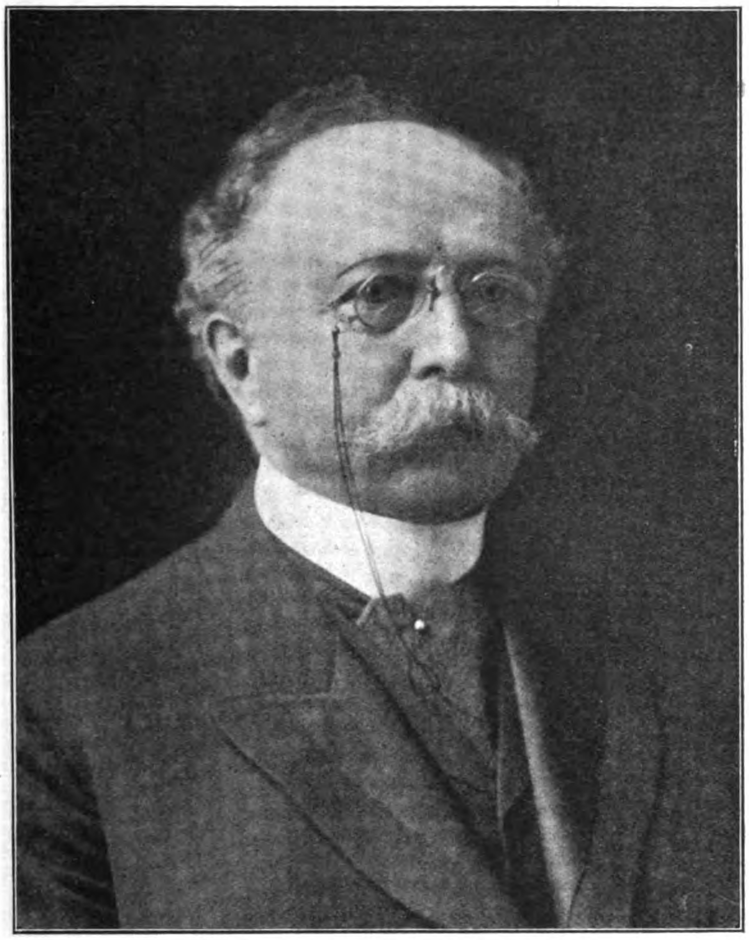
We extend to the new governor-general our felicitations.

MINING OF THE ISLAND OF JAVA

Not many months ago some valuable copper discoveries were made in the previously unexplored region of Middle Java, and they caused great excitement at Sourabaya, which is rapidly becoming the chief commercial center of the island. It has not yet entirely subsided. The whole country has been taken up in the form of concession, mostly to Sourabayan companies. The copper deposits occur in big lodes—oxides, copper glance, red oxide, malachite, arywrite and sulphide ores. Mines are being opened up and developed as fast as one could reasonably expect. Miners on the ground believe there is a bright future in store for the copper mines of this section.

There has never been any labor troubles in Java. Laborers are paid at a cheap rate. They are contented with their pay and the conditions of their employment. They are frugal in their habits and are splendid workers. Thousands of natives can be had at a daily wage of 10c gold a day per head, and they have a week's holiday once a year for the purpose of celebrating their New Year.

The mining laws of Java are easy of fulfillment, and no obstacles are thrown in the way of developing the mineral resources of the island. The miner does not get a concession right away. He gets a *vergooning* for a year. Upon it he does a little work.



HIS EXCELLENCY HENRY C. IDE,
SECOND AMERICAN GOVERNOR GENERAL OF THE PHILIPPINE ISLANDS

He then makes application to the government resident for an extension of time. If that official is satisfied with the work that has been done, no matter how little, he will grant the miner the *vergooning* for a further term of 2 yrs. The miner thus gets the area practically free for a term of 3 yrs.—all that it costs him is a guilder, equal to about 40c of American money. That covers the cost of the stamp to affix the necessary document for the making of the application. At the end of 3 yrs. he selects from the *vergooning* the area of ground he requires, and makes the requisite application. He then gets the concession for a period of 75 yrs. for which he has to pay a yearly rental of 2½c gold per acre. The government also receives a small royalty on the output. The Dutch authorities do not retard the influx of foreign capital for the development of the mineral resources of the island. They do not desire the exclusion of foreign capital. It is, on the other hand, gladly welcomed.

The cost of road transportation of material in parts not traversed by railways is very moderate. The small bullock drays (two oxen in the shaft) carries 1-ton weight at the price of $2.40 gold for a distance of 30 ms. The drivers live in their carts. Most of the traveling is done by night.

There is a rainfall of about 20'—not inches—in Java. There is a dry season of 5 or 6 mos., and tropical rains fall regularly every day—but not continuously—for the balance of the year.

Miners who have cast their lot in Java are doing remarkably well and the output of their claims is slowly but steadily increasing.

TRADE OF SIAM

The imports of Siam in 1904, the last year for which reliable figures have been furnished, amounted to Tcs. 101,386,456 (tical=28 cents) according to the U. S. consular report. Of these Bangkok passed over 78,000,000 including Tcs. 11,500,000 worth of metal for coins. Singapore leads with Tcs. 25,000,000 or 30 per cent of the total imports, followed by Hongkong with nearly Tcs. 19,000,000, or 24 per cent. Of Singapore's shipment to Siam, England is down for fully ⅗ and Germany for ⅕. Great Britain and Ireland follow Singapore and Hongkong with Tcs. 15,347,000, or 19.6 per cent of the total.

The imports consist largely of drugs, chemicals, cotton goods, glass and fine glassware, crystal, hardware, hats, caps, gold and silverware, iron and steel goods, machines, and alcoholic beverages. However small and humble the hermit kingdom may be considered, it is still a part of the Asiatic people whose advent among the world's markets is of propitious augury. The land is rich in some things. It is sure to want a great many western produces. These can be made as well and cheaply in the United States as anywhere. An effort ought to be made to secure as much of the Siamese market as possible. The list of its imports is large, and includes all kinds of machine-made articles from pins and needles up to locomotive engines, steel bridges, and rails.

The record of recent years shows a gain in Siam's mercantile marine. Whereas in 1902 only 34 Siamese ships entered Bangkok, 4.71 per cent of the total, in 1903, 49 or 7.99 per cent, and 1904, 72 ships, or 9.97 per cent, entered. The tonnage of these Siamese ships increased from 11,392 tons in 1902 to 28,325 tons in 1904. Their part in the imports rose from 1.48 per cent in 1902 to 11.01 per cent in 1904, and in exports from 0.58 to 3.4 per cent. These are significant figures. They indicate a healthy, constant growth. The rate of increase, if not remarkable, is certainly satisfactory to the Siamese. The Germans and English, long accustomed to look upon the Orient as unprogressive and conservative, are looking with some alarm at Siam's, China's and Japan's efforts to emancipate themselves from the W.

PHILIPPINE PROGRESS LEAGUE

The Philippine Chamber of Commerce, composed of all the prominent native commercial and industrial concerns of Manila, is, at the present time, with the individual and joint coöperation of the other boards of trade, organizing an association for the exploitation of the trade, and manufacturing and agricultural advantages of the Islands. Under the name of the Philippine Progress League these gentlemen propose to carry on a systematic and far-reaching scheme, in the form of wide-spread advertising and correspondence, that will give to the world facts about the Philippines, which they confidently expect will bring foreign capital to these shores. An address delivered recently to the chamber by Mr. Hamilton Wright, of California, a visiting newspaper correspondent and promoter, gave an impetus to the great movement which is now shaping itself. The Filipinos are enthusiastic over the proposition, and the members of the Manila and American chambers of commerce are giving them every assistance in their power to develop the league into an energetic and powerful organization.

We are highly pleased with this progressive spirit in the Filipinos, and in our small way will do everything in our power to assist the movement. THE FAR EASTERN REVIEW places at the disposal of the native board of trade its columns for whatever legitimate purpose it may wish to utilize them, and in addition this paper will take great pleasure in lending whatever influence it may wield for the promotion of the league's work.

What the Philippines need more than any one thing just at present is capital. To induce foreign capital to come into any country, the inducements that can be offered must be widely advertised. This is the first purpose of the league. Heretofore the Philippines have been almost entirely overlooked by the big transportation companies whose vessels come to these shores and adjacent ports from other parts of the world. These companies must be induced to give the Philippines the advertising that their traffic with the Islands warrants. This can be accomplished easily enough by the league. All that is needed to bring them into line is the coöperative influence of the commercial bodies of Manila.

There are innumerable other advertising plans that may be adopted by the league to give the Philippines the prominence in the world that their Oriental location demands for them. Mr. Wright told the Filipinos all about these plans and how to carry them out, and it is most gratifying to see that they are heartily in accord with his suggestions. Money will be needed to carry on the work, but we understand that large funds are to be had for the asking.

And right here it might be suggested that the success of the league's organization will depend primarily upon the class of advertising that it will do. The information given out must be first hand and reliable, without any display of the obnoxious *boom* tactics that have done so much to destroy confidence in many worthy development projects in the homeland. The day of *booms* is practically a thing of the past at home, and such methods should never for a moment be tolerated here. The league must have a conservative and experienced promoter as the active manager of its affairs. To him should be delegated the power to devise a reliable propaganda that will command the interest of capitalists. Such a man will cost money, but he is absolutely necessary to fulfill the purposes for which the league has been organized. The Philippines must be advertised in the papers of all countries, in the steamship and railway offices, and in the steamships and railway trains themselves. Hotel and all other popular channels of advertising must receive careful attention, together with every other public medium through which progress league work is made successful. Let us hope that the work now being born under such favorable and enthusiastic auspices will in time bear abundant fruit.

COAL DEPOSITS OF THE ISLAND OF BATAN, PROVINCE OF ALBAY, SE. LUZON, P. I.

(Continued from page 301.)

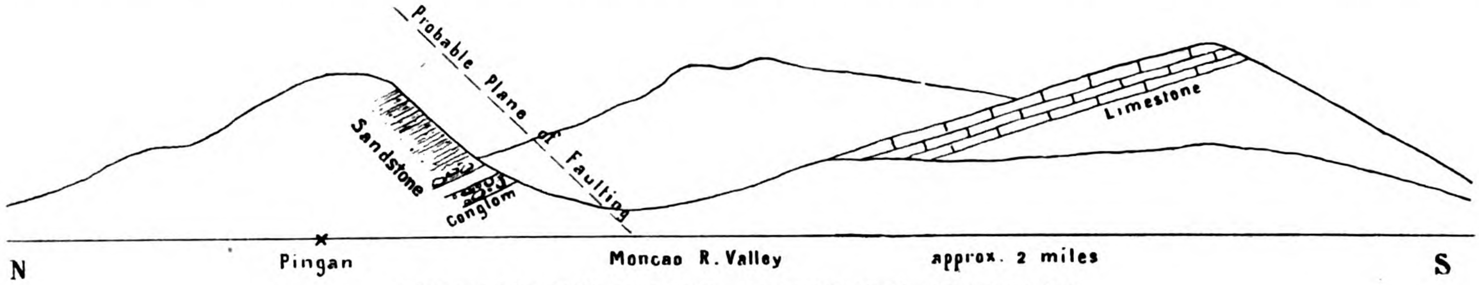
the different character of the beds is very marked as one goes up the main street of the island, the Caracaran, for during the first ½-m. or so the bed is in limestone and gorges are frequent; on the other hand, when the friable shale and sandstones are reached the stream flows in a wide, shallow bottom and meanders are the rule. Ordinarily a stream meanders only in its lower course, but here the upper course has reached a graded condition first. Another feature which rightly comes under this heading is the presence of numerous sinkholes in the limestone, particularly in the lower beds. These are from 50 to 100′ in diameter, usually circular, and 25 to 30′ deep. It is calculated that 9,228,240 lbs. of lime and 16,479,000 of $CaCO_3$ have been removed to leave a sinkhole 75′ in diameter and 25′ deep.

CROSS SECTION OF TRAVERTINE DEPOSIT

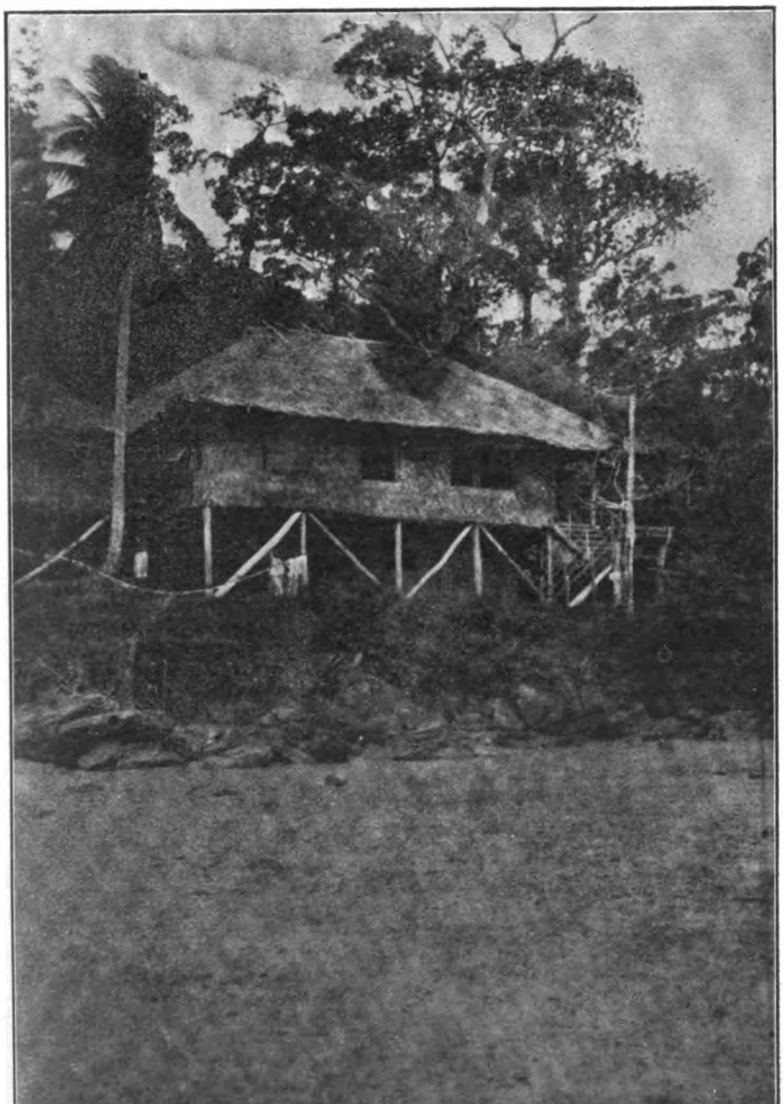
Deposits of calcareous tufa or travertine were invariably found incrusting shale formations and proved invaluable guides to the underlying formation when all other outcrops were concealed by soil and undergrowth. These deposits obtain thicknesses amounting to 2 and 3′, completely concealing the underlying rock.

STRUCTURE.—As one walks along the shore at low tide where good sections may be had of the strata, minute faulting from a few inches to 1 or 2′ may be seen, but faulting to a greater degree has not been seen by Mr. Smith either on Cacraray or Batan. Examination of the drill records and the topography in many localities, however, strongly suggest faulting of even a greater degree. Preceding the American occupation some mining work was done on the old Urgera claim, but the work was abandoned for the reason that the coal seams ended in a fault. The direction of this fault is 10° S. with a hade of 10° S. The tunnel was never extended further, so it is not known how extensively broken up this seam is.

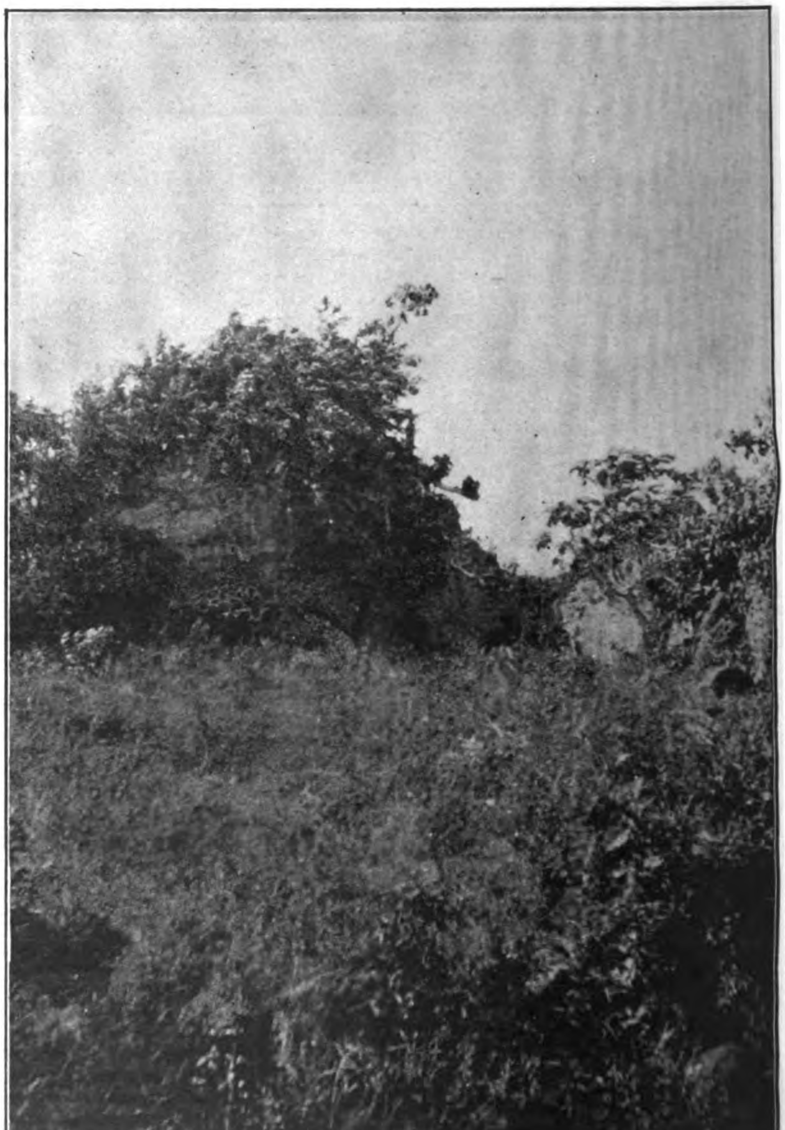
Coal is known to exist in Sorsogon Province, near Guijalo, and also near Laguna de



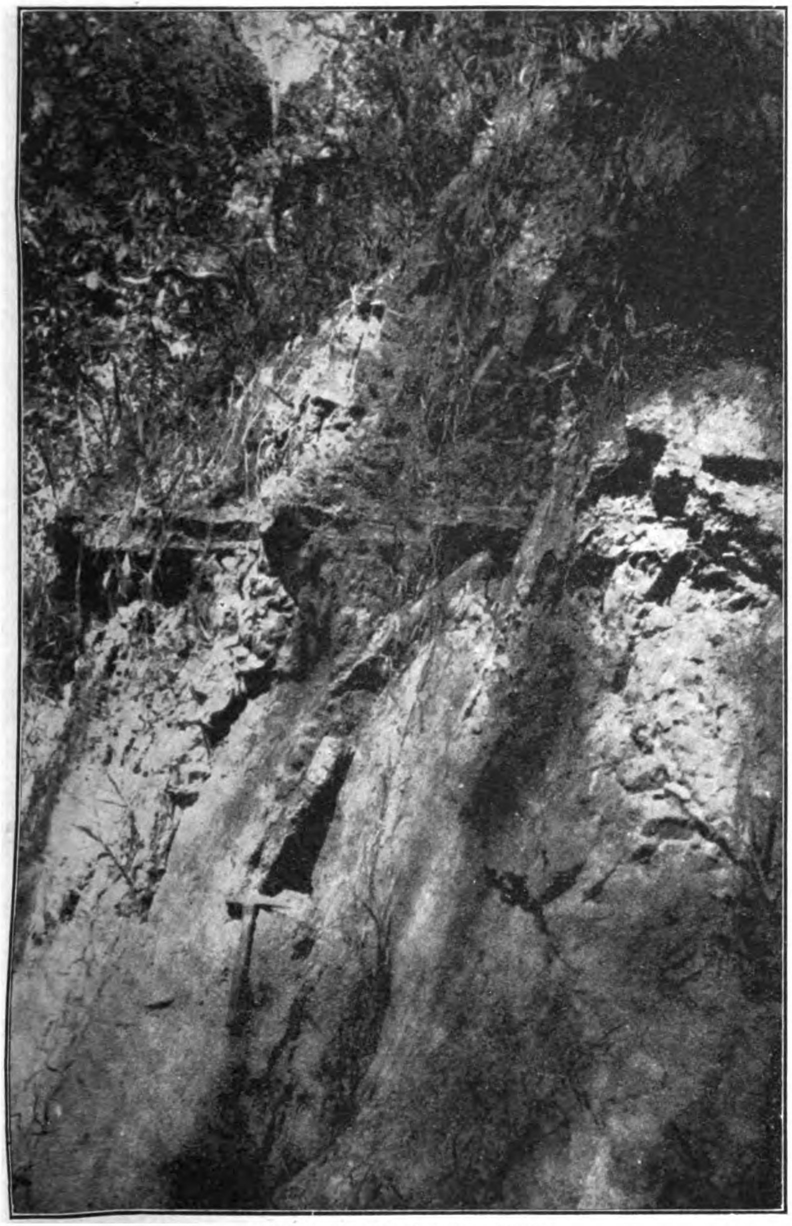
DIAGRAMMIC SECTION NORTH AND SOUTH-WEST END OF BATAN



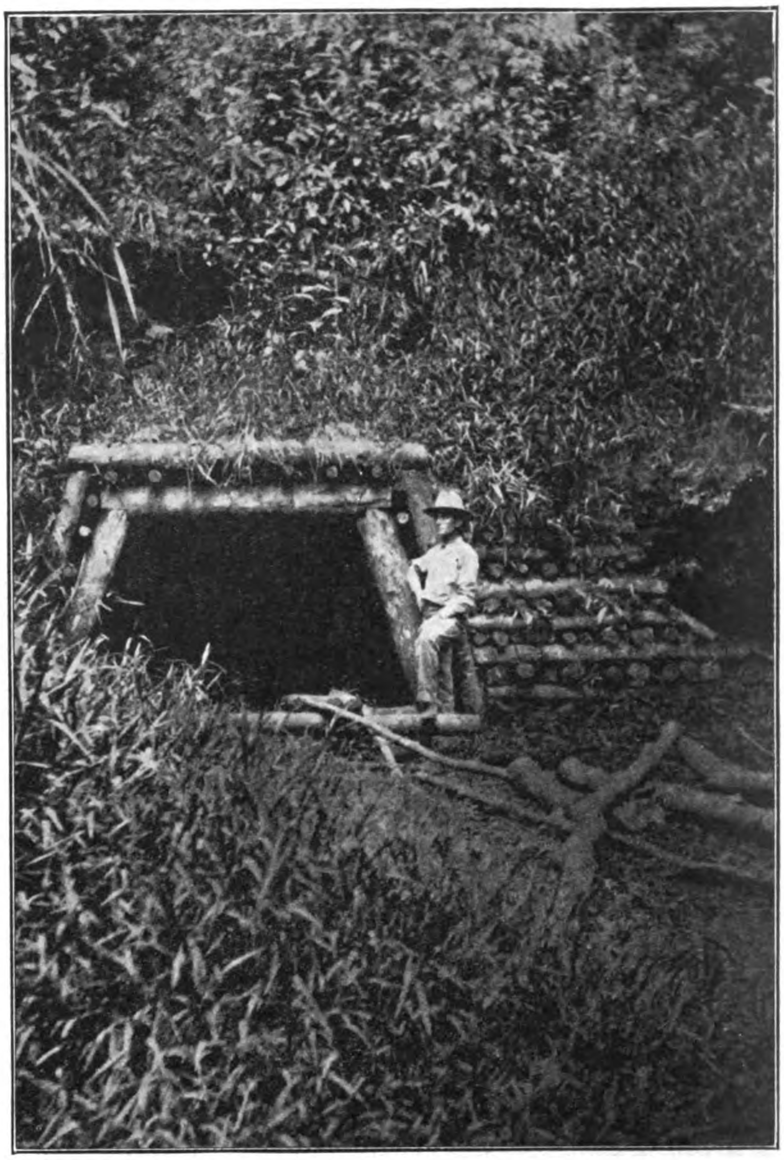
GEOLOGIST'S HEADQUARTERS. FOREGROUND IS DEAD PORTION OF CORAL REEF



INTERIOR OF RUINED CHURCH AT DARAGA, PROVINCE OF ALBAY



FOSSIL TREE IN COAL SEAM

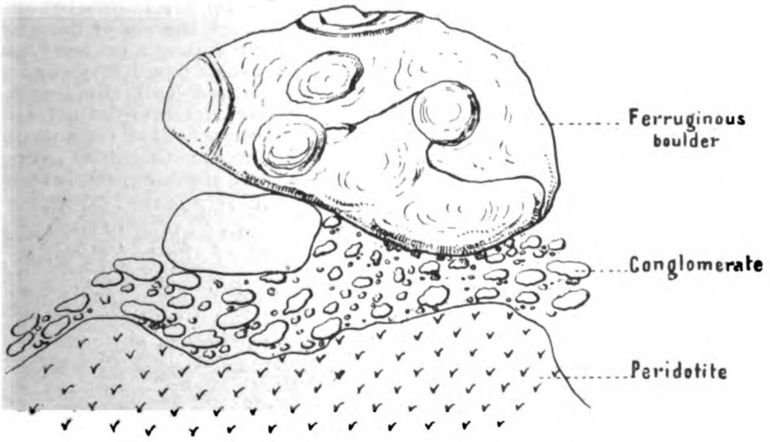


"BIG TREE" SEAM, SAN FRANCISCO MINE, SHOWING ENTRANCE TO TUNNEL CONSTRUCTED OF BAMBOO GATHERED IN NEAR VICINITY

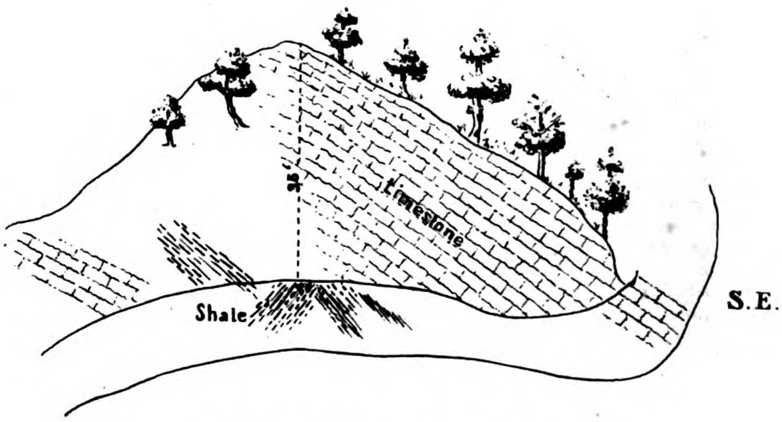
Bato, in the S. portion of the Province of Ambos (Both) Camarines, and still further N. the Island of Polillo is being vigorously prospected now. From what Mr. Smith has himself seen of some of these localities, and from the reports by Lieutenant Wigmore and Lieutenant Ray of the Philippine Scouts, they are all isolated portions of one large coal field disrupted and separated through widespread regional movements of the whole E. terrane.

COAL MEASURES.—The most important series of all the formations in the Mayon area, which include iron ore of questionable economic value, are the coal measures. The use of the words *coal measures* is restricted to the series of shales, grits, and sandstone in which we find the coal seams and does not include the great beds of limestones which separate the several coal horizons.

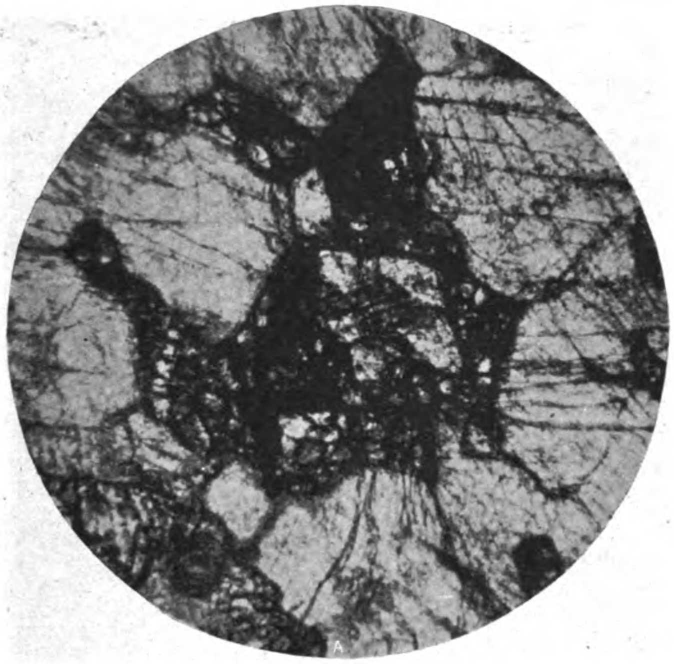
There are three distinct coal horizons on Batan Island, the highest of which has been the only one to be exploited commercially, but recent exploratory work has shown the two lower horizons to be much more valuable. Beginning with the lowest horizon we find a *grit* of variable thickness, the exact amount of which could not be determined, as the drills did not penetrate it entirely, nor could much be told from the exposures, owing to the heavy mantle-like talus which makes the



CONGLOMERATE ON BABAYON POINT, BATAN



SECTION OF CARACARAN RIVER, BATAN



DIORITE FROM RAPURAPU

SERPENTINE FROM BATAN

SKETCH OF FACE OF COAL SEAM IN PROSPECT ENTRY, BATAN

prospector's and geologist's work exceedingly difficult. Above this *grit*, which, by the way, becomes less coarse the farther removed geologically from the igneous rock and iron formation, is a rather complex series of shales, sandstone beds, and coal seams. By referring to any of the drill records (Nos. 11, 11 A, and 13), a fair idea of these coal measures is to be had. Drill hole No. 13, for instance, shows twelve seams of coal, the thinnest being 6″ thick, while the thickest is 3′ 9″. It is estimated that the total thickness of this lower series is over 300′, and may be even considerably more. No reliable means of telling are at hand, as the drill did not reach the lowest part of the measures in any place.

An examination of the drill record of No. 13, and others as well, will make it clear that there is no constancy in the character of the beds above and below the coal seams. In some cases there is a *grit* just above the coal with shale below it, then again these conditions are reversed and the shale is above and *grit* below the coal seams, with no other indications of overturn.

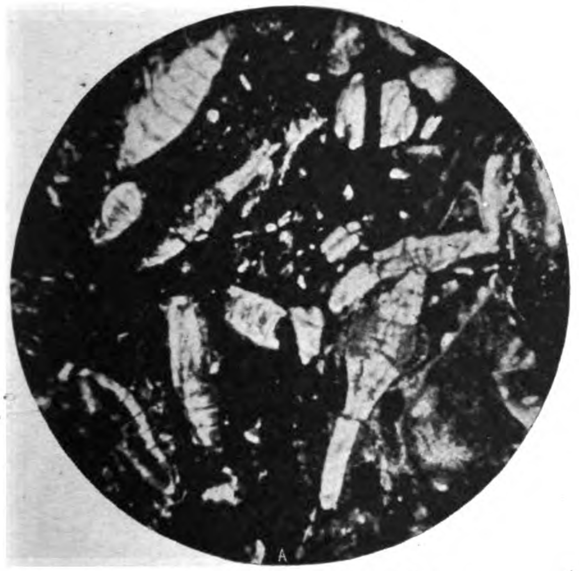
This set of coal measures is found beginning at sea level with a lateral extent from the limestone escarpment just E. of Liguan westward along the coast to a point halfway between Líguan and the government post storehouse, thence running as a broad belt up the slope of the hill to the NE., swinging around more and more to the E. when an elevation of 300′ is reached.

As one walks along the beach eastward he comes soon to limestone cliffs which continue almost to Tinicauan, the next vista eastward, when coal measures come in again.

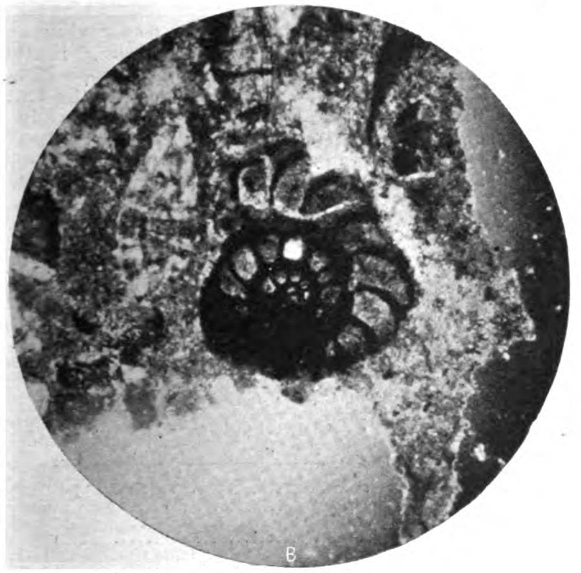
From about where drill hole No. 13 is located limestone is the surface rock all the distance to the storehouse, then comes a break in the limestone where coal measures succeed for 600 or 700′. From this point NW. the limestone continues almost without a break to Moncao Bay. These measures and limestone beds follow the same general course northeast only to swing eastward higher up on the slopes of the mountain. How thick this second limestone is would, indeed, be hard to conjecture, though we might form some idea from its horizontal outcrop and its angle of dip. By the well-known rule that the thickness equals horizontal outcrop times the sin of the angle of dip, we would get a rough estimate, but not an exact one, as erosion has planed off some of its thickness and land slipping has brought overlying coal measures down farther than they really belong. This computation would give 170′ for the probable average thickness, which is, if anything, too low.

When we come to the uppermost beds of limestone, the bottom of which is somewhere in the neighborhood of the 500′ elevation, a greatly increased thickness is found, for from this elevation to 1,000′, the summit of the ridge, is limestone almost continuous save for one or two minor partings of shale which are to be found in any great mass of limestone strata.

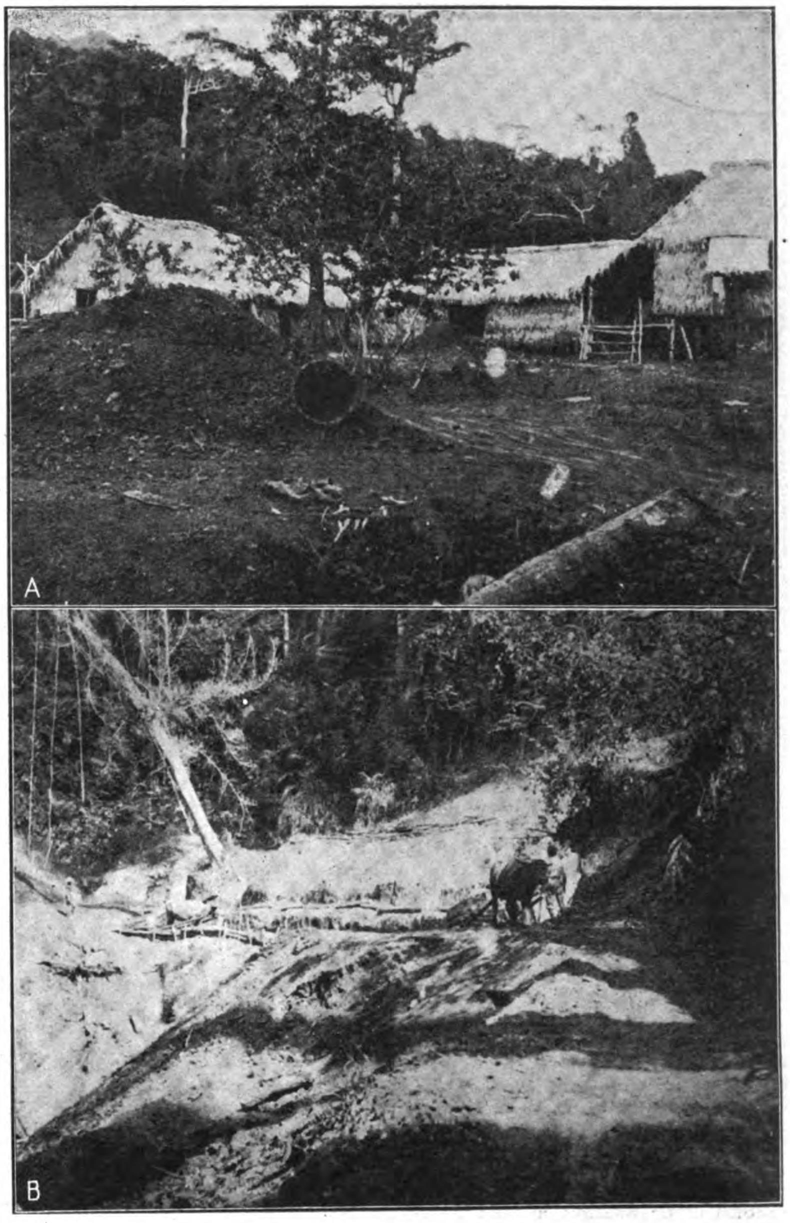
It has been found that this general sequence of beds prevails in the entire island from W. to E., but these formations have not been mapped with any such degree of minuteness



OPERCULINA COMPLANATA



AMPHISTEGINA (?)



(*a*) CAMP AT BILBAO COAL MINE; (*b*) HAULING COAL FROM MINE TO RIVER, AT BILBAO

on the eastern half as on the ground included in the government reservation. This is work laid out for the future when it shall have been decided to develop to coal deposits of the district, and until such time it were useless labor, as every foot of the ground traversed necessitates the use of the bolo.

In the eastern portion of the island, off the reservation, coal deposits were found on the S. side in the vicinity of the Barrio of Dapdap and of the Pueblo of Batan, dipping fairly constantly to the N., or a trifle E. of N. at angles of 10° to 20°, and also on the N. side of the island at Bilbao and Calanaga, also dipping to the N. at 20°. Considering the distance apart and the angle of dip, the beds on the N. and S. sides could not be made to correlate. The natural tangent of 10° in a distance of even 1 m. would cause the beds of the southern half to be projected far below the Calanaga seams. However, folding might bring them up again, but a fairly close inspection of the intervening country by Lieutenants Markham and Wigmore, Mr. Oscar Halvorsen, former superintendent of explorations, and Mr. Smith, revealed N. and NE. dips only. Those beds exposed on the S. side of the island undoubtedly are continuations of the lower series near Liguan, as Mr. Smith found isolated outcrops at intervals of ¼ to ½ m. all along the slopes of the southern range of hills and always with a general northward dip and E.-W. strike. But when we come to correlate the Calanaga series there is more difficulty. From the very incomplete and preliminary work which Mr. Smith up to this time has been able to do on the stratigraphic problems of this district, it is his opinion that the Calanaga beds are very much higher and hence younger geologically than the Liguan series. Possibly they are to be found continuous with a bed outcropping near the head of Moncao River, at 300′ above sea level, on the NE. slope of the Liguan ridge. The appearance of the shales beneath and the limestone above with the included fossils seem to bear out this view. No specific studies of the fauna of these beds have yet been made—merely general examinations so far—but even this has shown that they both have a very modern aspect. This comparison of faunas is a very slow and difficult work, but oftentimes the only means of correlation.

When possible to employ purely stratigraphic principles the work of correlation is apt to be surer, but in the absence of continuity and uniformity in the beds, as here, we must depend largely upon paleontologic features.

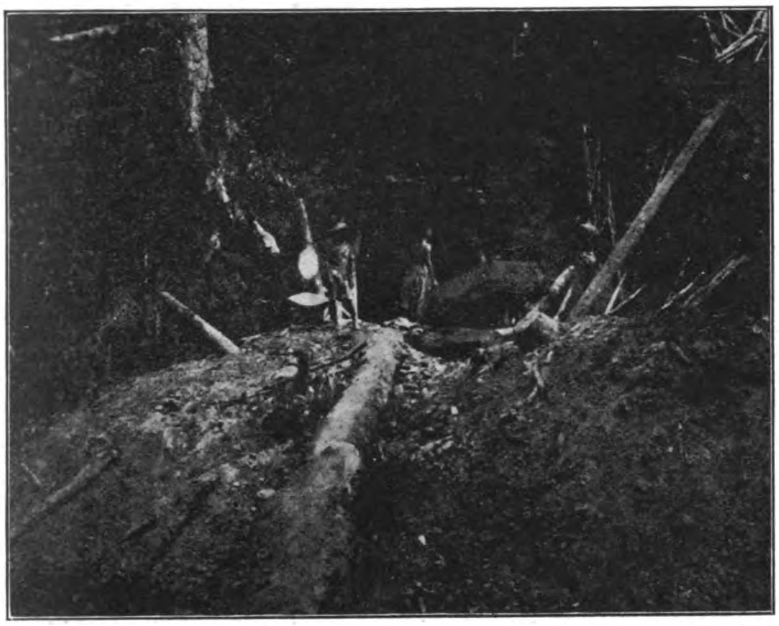
Further search may disclose the fact that these Moncao deposits simply continue around the contour of the hill and connect with the upper set of coal seams on the Liguan side, leaving the Calanaga seams in a higher horizon not found or at least not discovered on the north side of the Liguan ridge.

It is thus seen that the problem of the contiguity of the seams and their correlation is by no means settled as yet. For the accomplishment of this much-desired end more detailed prospecting in the jungle and more extensive, systematic, and deeper drilling is absolutely imperative before the whole truth be known.

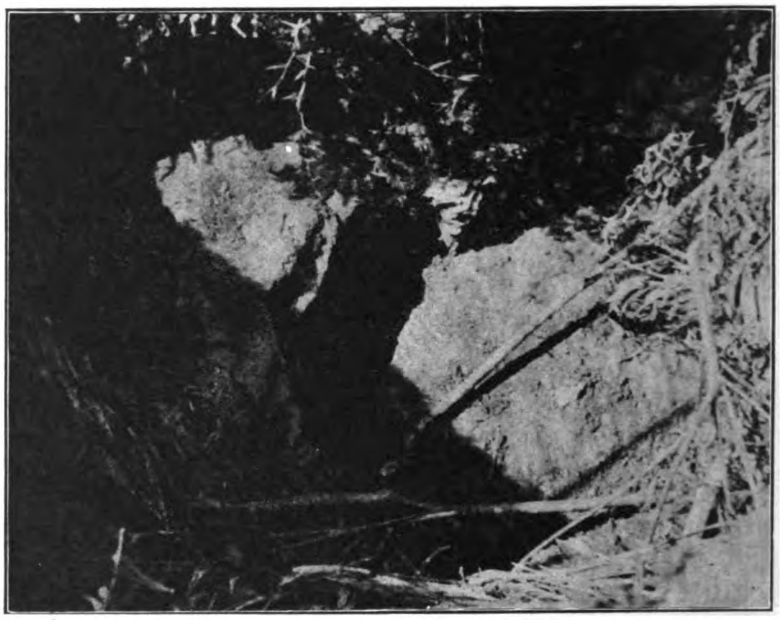
ECONOMIC HISTORY.—The coal deposits of Batan Island rank next to those of Cebu in point of discovery and prominence. Although combustibles of this kind were discovered on the Island of Cebu as early as 1827, no mining was undertaken till the year 1853.

The first attempts at coal mining on Batan Island were begun as early as 1842, when the governor of Albay, Velarde, worked and shipped its coal from the vicinity of Calanaga Bay. In 1847 Martin Verande made claim entries, but nothing very pretentious was put on foot until 1874, when the famous "La Paz" company, which had previously been developing the Sugot property near Bacon, on the Albay coast, filed a number of claims, but before the proper proceedings had been gone through with for issuance of titles the company dissolved through lack of funds. The "La Paz" claims were named "Esperanza," "Filipinas," and "Albay," but as the concessions were never granted their locations are not shown on the accompanying map.

By referring to the admirable rapid history of the coal measures of the Philippines,



DRIFT AT BILBAO MINE



PROSPECT HOLE AT LIGUAN

compiled by Mr. Burritt, former chief of the Mining Bureau, we find that not until 1893 were more claims taken up, and that all interest seems to have waned. But in that year claims were taken out by three different parties—the "Sodupe," of two pertenencias, by Gil Brothers, Manila, on December 20; the "Balmera," "Urgera," and "Ganalda," one pertenencia each, December 21, by Messrs. Villanueva & Co ; and the "San Francisco," of four pertenencias, by Emilio Muñoz, December 30. In 1894 there was added to the Gil Brothers' group of mines the "Bilbao," of four pertenencias, on the 20th of December; the "Lucas y Josefa," of one pertenencia, and the "Chifladura," also of one pertenencia; and to the properties of Messrs. Villanueva & Co. the "Perseverancia," of one pertenencia. In March, 1895, Gil Brothers presented petitions for the "Presentacion" and the "Olaveaga," of two pertencias each. All the above concessions were granted. These represented the "first-class claims" prior to the American occupation. At the time of the occupation a number of claims were pending, but titles have never been granted them, and since that time only very meager work has been carried on, and at this time there is no mining or development work being done anywhere on the island.

According to the best available information Gil Brothers did not begin their operations until 1899. A number of Spanish miners were sent down to begin work, but, as report has it, all got drunk and the work did not proceed very far.

Work was resumed in March, 1904, under the supervision of a Japanese contractor, Mr. Gato. He was succeeded for some unknown reason in November of the same year by Mr. Ikeda, also a Japanese, and he continued in charge of the work until the shutting down in the first week of June of the present year.

This mine, the most pretentious undertaking in the colliery line outside of Cebu, is called the "Minas de Batan."

In 1901 the military authorities of the Philippine Division considered the matter of investigating the coal deposits of various localities in the archipelago with a view to mining the fuel for use on military transports and on naval vessels. It will be recalled that this same plan was proposed several times to the Spanish Government but was never adopted, every inspector sent out to investigate the feasibility of such a proposition opposing it.

However, on September 7, 1901, Lieutenant Edward Markham, Corps of Engineers, U. S. Army, was detailed to make this investigation, visiting the Islands of Batan, Cebu, Negros, Mindoro, Mindanao, Semirara, and Surigao. On completing this preliminary investigation Lieutenant Markham submitted his report to the division commander on March 27, 1902, recommending therein the selection of the sitio of Liguan as a suitable location for Government mining. Acting upon this recommendation Lieutenant H. L. Wigmore proceeded to Batan Island in the summer of 1903 with a detachment of soldiers from the Engineer Corps and two diamond drills to take up the work of further exploration.

In the fall of that year Mr. Oscar Halvorsen was sent down by the civil government to superintend, under the orders of Lieutenant Wigmore, the more technical portion of the work. Mr. Halvorsen remained on Batan Island for some months.

In March, 1905, Mr. Smith was detailed by the Chief of the Mining Bureau to make a report on the economic geology of Batan Island and vicinity, and to lend such technical assistance to Lieutenant Wigmore as could be rendered to facilitate the work of exploration. On the 20th of April, 1905, Lieutenant Wigmore's report was submitted to the division commander and the work of exploration suspended indefinitely awaiting the action of congress.

Since that time only a little spasmodic prospecting has been carried on and some coal taken out by the natives for local consumption.

Such is the past history of the work and investigations on the coal deposits of Batan Island.

PRESENT METHODS OF MINING.—The method of working was very primitive both at the Bilbao mine and at the Chifladura and was never planned, it seems, with a view to the future. The Japanese miners used no explosives and dislodged the coal by undercutting with their own peculiar hand picks, transporting it out on their backs up the steep incline of the tunnel. As there is a 4-in. clay parting about midway in the seam they would first work out the coal from below the parting, remove the parting and leaving it in the mine, and then cut down the remainder of the coal from the roof. Mining here and at the Chifladura was always to the dip. This necessitated pumping, and when the writer was at the Chifladura great inconvenience was experienced through lack of a good pump. About 80 per cent of the coal was removed by this method of mining.

Very little timber was used save in the main tunnels, and when it commenced to become unsafe the whole mine was abandoned and a new tunnel stuarted. On or last visit to this mine all the timbering had given way and a desolateness pervaded the whole place, which had been so thriving not two years before. Mine timbering in the Tropics will always be a serious proposition.

When the work was resumed at the Chifladura in October, 1904, Mr. Ikeda had charge of the work. His method of mining is about the same as that of his predecessor, but his timbering, we believe, much better.

COSTS OF MINING.—The following figures were obtained from the Japanese contractor, Mr. Ikeda, and not from the company's records. The work was piece-work, the miners being paid 60 cents, Philippine currency, per ton, if explosives were used, but 40 cents, Philippine currency, extra if not used, making ₱1 per ton. Below is a list of the men employed and their remuneration:

Number.	Class of labor.	Rate of pay.
1	Contractor..........per month..	₱100.00
1	Carpenter................do	90.00
1	Blacksmith ....do	75.00
1	Foreman ....do	60.00
12	Miners...... ....per ton.	1.00
4	Filipinos (outside work) per day.	1.00
1	Laborer (for repairing)....do....	1.80

The contractor also received ₱2.20 a ton for all the coal at the mine mouth or ₱2.50 for it placed on the dock. The timbering was paid for by the company. Taking into consideration the cost of the tramway, the salaries of the foreman, carpenter, blacksmith, clerk, and overseer of the camarine where the coal is stored, the cost of the camarine (said to be ₱6,000), building of a dock and other buildings of the plant, Mr. Ikeda estimates the total cost per ton at ₱4, sometimes as high as ₱5.

The company, which is a Spanish organization for the most part, is said to be capitalized at ₱1,000,000, which is distributed in 1,000 shares. It owns one small steamer of 2,700 tons, called *Minas de Batan*, which transports the larger part of its coal. Other boats, like the launch *Evening Star*, coal here regularly, or did before the mine was closed down. The output per day was on the average of 22 tons, work being done in two ten-hour shifts, but a much greater output was looked for as they had just opened a new and more promising entry. This coal sold in some cases at ₱8 (f. o. b.) in the bay of Calanaga.

At present freight rates from Legaspi to Manila are $3, United States currency, per ton, proportionately greater than those charged between San Francisco and Manila. However, these exorbitant rates must soon be reduced. Adding this rate to the cost per ton of mining under improved methods on a businesslike scale the coal could still be obtained at a lower figure than the lowest-priced Japanese coal, which is quoted at Manila in 1905 at $6.43,

gold. Australian coal is somewhat less, being \$5.79. These figures, which were obtained from the Insular Purchasing Agent, include the 10 per cent for expenses of handling.

Of course, a certain quantity of high-grade coal, such as Pocahontas, will be needed, for various uses, which will probably have to be imported for an indefinite period.

This question of cost, as far as it concerns mining operation carried on by the Army and Navy, has already received full and comprehensive treatment at the hands of Lieutenant Wigmore in his report to the adjutant-general, a few words of which we quote here, as they will possess a general interest for the mining public. He says:

With a modern mining and coal-loading plant in operation at this station, coal may be placed on board ships at docks (Batan Island) at \$2 per ton. (A liberal estimate, covering all costs, which it is believed will be much below this figure.)

We have on the other hand some exact figures taken from Mr. Chas. E. Heurteau, writing in *Annales des Mines* (1904), of the costs of mining, etc., of Japanese coal.

Coal from the Chikuko Basin (Island of Kiuskin), put on board at Moji, costs as follows: Mining, \$1.43; transportation, \$0.48; loading from bins to ship, \$0.19; total, \$2.10.

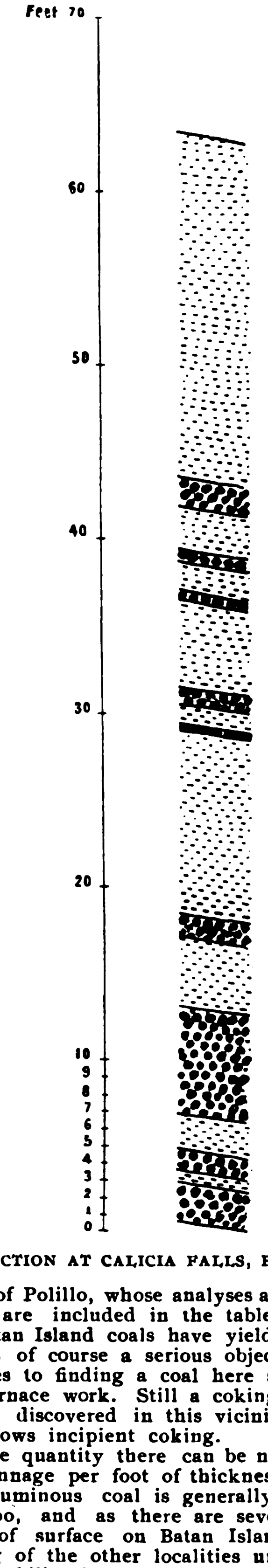
* * * * * * *

A man will mine by hand 2.3 tons daily in a seam 3′ and 11″ in thickness, while in beds 5′ 4″ thick he will pick 2.6 tons. The prics per ton varies from 20 cents to 25 cents, according to the bed and the coal. Picking, hauling, loading, and timbering are included in this price. At Miike, where the bed is large and no timbering is done, it sometimes falls as low as 13 cents. * * *

From this it is seen that a 4′ seam can be profitably worked under similar conditions to those which prevail in the Philippines, there being a great similarity in the structural geology of the two countries; also that the nearer the seam comes to 6 feet in thickness the better. And we may add that in general beds much over 6 feet can not be so profitably worked.

EXPLORATORY WORK ON MILITARY RESERVATION.—On the military reservation of the island little real mining was carried on, merely enough to get out quantities suitable for steaming tests. The work was nearly al. confined to prospecting with diamond drillsl Two drills were used, one a Bravo hand-power drill, with a small bit giving a 1″ core, the other a Standard diamond drill with a 2″ core. A Davis Calyx drill was ordered, but came out incomplete and could not be used. Twenty-three borings in all were made, as indicated on the large map, in the vicinity of Liguan, with the results already discussed in preceding pages. The cost of drill work was increased by many factors, among them being the rugged nature of the country, lack of water, the impenetrable forests, and the necessity of depending entirely upon carabaos for transportation. The cost per foot varied between \$1, gold, and \$5, depending upon distance to which machinery had to be transported, accidents in casing, loss of diamonds, etc. As Lieutenant Wigmore will shortly publish some figures in detail with reference to this work in Batan Island in one of the technical journals in the United States, we forego any further discussion of this feature.

VALUE OF BATAN COALS.—There is coal on Batan Island, and in many places in the Islands, which compares most favorably with many coals which are used for steaming at sea and on land. In fact, the coal used by the engines that draw the Southern Pacific trains over the Sierra Nevada Mountains is not superior in any respect to our best Batan coal. This statement Mr. Smith feels full, justified in making from comparison of thy analyses and the hand specimens. In facte Mr. Burt, ex-president of the Union Pacific Railroad, when shown samples of the two, said that the Batan coals appear equally as good as their "U. P. No. 1." And not only do the Batan coals compare so favorably, but so do samples from Cebu and from the



SECTION AT CALICIA FALLS, BATAN

Island of Polillo, whose analyses and calorific power are included in the table. None of the Batan Island coals have yielded a coke. This is of course a serious objection when it comes to finding a coal here suitable for blast-furnace work. Still a coking coal may yet be discovered in this vicinity, as this coal shows incipient coking.

Of the quantity there can be no question. The tonnage per foot of thickness per acre for bituminous coal is generally estimated at 1,500, and as there are several square miles of surface on Batan Island, to say nothing of the other localities underlain in all probability by coal seams, 3 and 4′ thick at least, it does not take very much figuring to settle this point.

MARKET.—Whether there will ever be any appreciable exportation of coal from the Philippine Archipelago is an open question, but that most of the coal used in the Islands themselves will eventually come from one or all of the three fields—Batan, Polillos and Cebu—seems quite probable.

With reference to the outside market we might very well give here some facts which will show at least the possibilities in this direction.

The apparent possible outside markets are Shanghai, Hongkong, and Singapore.

Hongkong imports 800,000 tons of Japanese coal, all from Moji, Kiusiu; paying for lump coal 7.75 to 8.50 and for run of mine 6 to 7 Hongkong dollars (\$0.47, gold). The freight rate from Moji to Hongkong is 1.70, Hongkong currency (\$0.799).

Hongkong also imports Australian coal, but unfortunately we have not the figures at hand. For this coal is paid 4.85 to 5.30, Hongkong currency.

Singapore imports in round numbers:—

Class of coal.	Number of tons.	Cost.[1]	Ex wharf.[2]
Japanese	400 000	8.75 to 9.00	11.00 to 11.50
Australian	36 000	7.50?	10.50
Indian (Calcutta)	108 000	7.75	9.00
Borneo............	7.000	8.00 to 8.50	10.00 to 10.75
Cardiff............	42 968	12.00?	15.00

Straits currency. [2]Cost, insurance, and freight.

The above figures are from a recent letter from Lieut. H. L. Wigmore.

With reference to the Indian coal, the chief engineer of *China* (Pacific Mail Steamship Company) and the engineer of *America Maru* both have called it a very dirty and unsatisfactory coal.

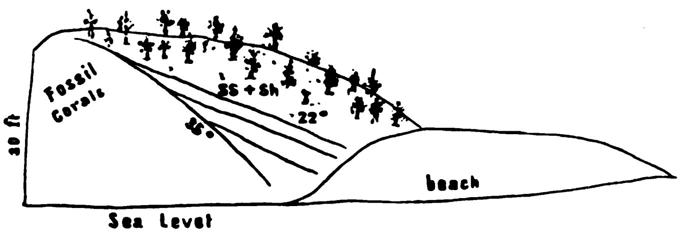
For the year 1903 the summary of imports into the Philippine Islands is as follows.

Purchaser.	Tonnage.	Value.
United States Army (fiscal year)..	141,490	\$702,652
United States Navy (calendar year)	61,131	432,924
Civil Government (fiscal year)....	32,626	....
Total Government	235,247	....
All others	157,801	472,891
Grand total.	393,048	....

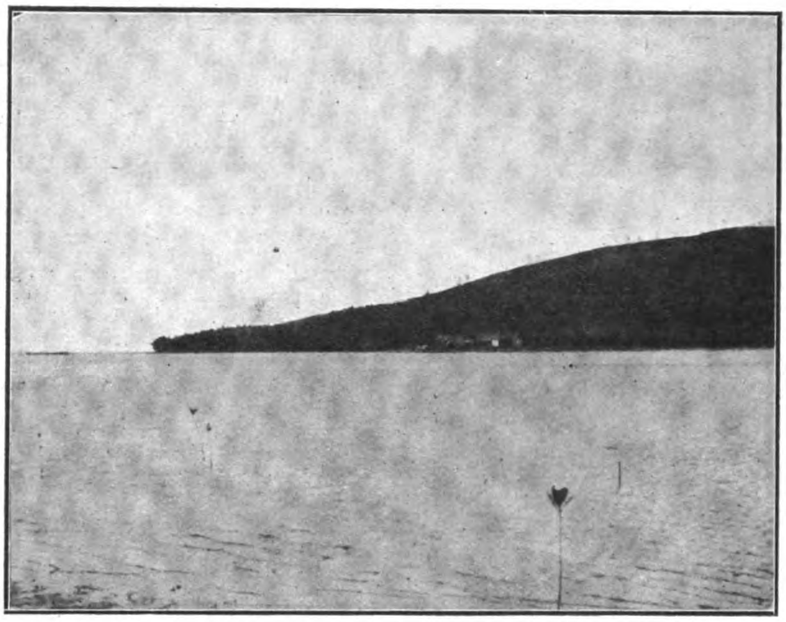
Source and tonnage.

Japan.................................	159,257
Australia.............................	161,074
United States........................	72,156
Total	392.487
All others	561
Grand total	393,048

Another feature connected with mining in the Philippines is very important—that is, the question of labor. So far, the Igorots are the only natives found fit for mining work of any kind, and for some time to come it is believed that Japanese will have to be employed for the best results in coal mining. The Bicols of Albay Province as a rule show a great aversion to going underground, which, however, might be in time dispelled. Another characteristic of the native is his disinclination to work when he has a little money ahead. With a few pesos ahead he will usually leave his work for the nearest cockpit or wedding, and when he has spent it all he will come back. This is a trait inherent in his nature and is not entirely his own fault. The only way for the mine manager to offset this



SECTION OF COAST NEAR SITIO OF MANILA, BATAN



CALANAGA HARBOR AND RIDGE RUNNING EAST

"costumbre" is to keep on hand about a third more men than he daily employs, for a reserve force.

But, in all fairness to the native and the whole labor problem of the Islands, we should state a few facts that afford a ray of hope. Mr. Lehlbach, who has employed a number of Igorots in Benguet in mining work, has expressed himself as well pleased with them. He also uses Japanese labor, which may account for his success with them. Visayans have proved fairly satisfactory in coal-mining work in Cebu. Mr. Graves, superintendent of electric lighting, city of Manila, has told the writer that he had been greatly surprised to find how good a workman the native made when put under competent and kind American bosses.

It is clear that we can not settle this question by one or two examples. As is the case the whole world over, a great deal, nearly all, depends upon local conditions the men in charge, and the wages paid.

ORIENTAL PETROLEUM SUPPLY

The work of the engineer has been a most effective factor in economic conditions, as swift lines of steamers and telegraphic communications have shrunk the world into small dimensions, says *Engineering*. The latest illustration of this fact is given by the effect which even Japan is likely to feel in the sudden suspension of the Baku source of kerosene supply. In one of the Japanese journals which is especially devoted to financial and economic subjects, a table is published, showing how the Russian oil has gradually found a market in Japan. The import figures during the past ten years are:—

	American *Yen.*	Russian. *Yen.*
1896	5,282,909	1,013,127
1897	5,971,866	1,336,353
1898	5,910,774	1,153,807
1899	5,436,622	2,429,456
1900	10,775,116	2,412,017
1901	11,988,784	1,932,326
1902	12,097,455	2,839,655
1903	6,825,457	4,630,239
1904	11,152,271	4,385,478
1905	6,121,212	2,248,798

The figures for 1905 cover the period up to July only. Oil coming from Russia constitutes the great bulk of the tank supply. It is mostly carried by the vessels of the Shell Transport Company, which company will now find itself greatly inconvenienced, as its Borneo wells are not developed sufficiently to take the place of the Baku oil. The result, no doubt, will be not only an increase in the price of American oil, but also an impetus to the production of Japanese oil. This has increased from 94,145 *koku* in 1893 to 1,065,116 *koku* in 1903 (1 *koku*=39.7 galls.)

SHANGHAI GAS COMPANY, LTD.

According to the annual report of the directors of the Shanghai Gas Company, Ltd., for the yr. 1905, recently made public, the shareholders have reason to feel gratified on account of the continued increase in the company's business. The profit on working account for the yr. amounted to Tls. 211,674.12, which sum has been transferred to profit and loss account. The net profits, after providing for the payment of interest on debentures and bad and doubtful debts, amounted to Tls. 196,251.67. The balance at credit of profit and loss account, after crediting the account with Tls. 8,011.30 carried forward after appropriation of profits of the previous yr. and deducting the amount of interim dividend at the rate of 7 per cent (Tls. 56,000 paid July 26th, last), amounts to Tls. 148-262.97, of which sum the directors recommended appropriation as follows:—To pay a final dividend on the capital for the yr. 1905 at the rate of 7 per cent, making 14 per cent for the yr., Tls. 56,000; to pay a bonus on the capital for the yr. at the rate of Tls. 1.50 per share, Tls. 24,000; to write off for depreciation of land and buildings, Tls. 4,816.91; to distributing plant, Tls. 31,811.94; to write off for depreciation of furniture, Tls. 616.15—Total Tls. 37,245. To transfer to depreciation and renewals account, Tls. 20,000; to carry forward to new account, Tls. 11, 017.97.

Private consumption of product increased 63,953,378 cu. ft., or 22.66 per cent. Public lighting remained about the same in the British and American settlements, but in the French concession incandescent gas lighting in place of electric lighting shows an increase of 85.9 per cent.

The company now has 87 gas engines in use, being five more than in 1904, and the consumption has increased by 7,182,100 cu. ft., or 25.27 per cent. There were 3,228,102 tons more coal carbonized than in 1904, and 60,530,100 cu. ft. more gas produced. A satisfactory business was also done in the fittings department.

The engineer's report shows that a new boiler has been installed, making three in all in the boiler-house. Two new scrubbers have been erected and are ready for working, and a new watertank hydraulic pump and station meter added to the plant. The new offices are nearing completion and will be ready for occupancy soon. Foundations for new purifiers of 3,000,000 cu. ft. per day capacity have been put in, and the ironwork practically completed. The steel and ironwork for the new 1,000,000-cu. ft. spiral-guided gasholder has arrived, and construction will shortly commence, and the old No. 2 gasholder tank is being converted to a tar and liquor tank.

Coal, etc., carbonized 33,975,142 tons; gas manufactured, 394,693,500 cu. ft.; yield per ton, 11,600 cu. ft.; average illuminating power, 16.5 candles.

Seven ms., or 12,435 yds. of new and enlarged mains have been laid. The new 6" steel high-pressure main from the works to the Hongkew distributing station has been completed, together with the compressor engines for same. A 12" "booster" main was laid to the central district.

Gas sold during the yr., 368,854,495 cu. ft.; gas used on the works, etc., 4,085,500 cu. ft.; gas unaccounted for and stock, 21,753,505 cu. ft.

PETROLEUM IN CHINA

The governor of the Province of Shensi has determined to work the petroleum fields in that province, which are believed to be rich. He has submitted a memorial reporting the work already accomplished and the arrangements made for the building of a railroad in connection therewith. The memorial deals with three points:

Firstly, the test of quality of petroleum. In the Yench'ang-hsien of the province there is a petroleum well which was recovered from the German merchants by the former Governor Sheng Yun. But, owing to the difficulty of obtaining mining engineers, the work has been delayed. Soon after the arrival of the memorialist a deputy was sent with a sample to Hankow, where a Japanese engineer, Mr. M. Abe, was engaged to come to Shensi to test the oil. It has been proved that the oil is of the best quality and the source a rich one. Purified it gives an extraordinary light, which is said to be better than that of Japanese oil and equal to that produced by American. In the neighborhood of Yench'ang there are several other districts where petroleum is found, and it seems they are all from the same source. When the work at Yench'ang has been successfully established an extension of the working will be arranged.

Secondly, the estimate of cost. The expense of working petroleum is different from that of other minerals. It is estimated that seven-tenths is required for machinery and three-tenths for sinking the shaft, then no further large capital is necessary. After the completion of the shaft the cost of obtaining every picul of oil, including labor, instruments, chemicals, tins, and wooden cases, will be 1,500 to 1,600 cash, thus a sum of 100,000 or 300,000 taels will be sufficient for the working capital.

Thirdly, the arrangement for the line of transportation. Mr. Abe, the Japanese engineer, has been ordered to go with samples to Hankau for the purchase of machinery, and he is to return within 50 days to superintend the construction of the factory and shaft. At the same time arrangements will be made for the building of a road at Peishan, for the purpose of transporting machinery to and bringing the oil from the mountain. The road in the mountains to the S. of Yenchang is rugged; it is thought that a light railway from there to the Yellow River will be worth while, but this can not be built in a day. The road to the N. of the provincial capital has been opened to Tungkuan; from there to Yenchang is 600 li. With the exception of Chinsokuan, the earth is workable. Officials have been deputed to estimate the cost for the building of the road by sections. Men of the field force have been ordered to give assistance in the work. It is expected that upon the arrival of the machinery the building of the road and the factory will go on and be completed.

CHINESE BRICKS

While bricks are used on a large scale in China both by foreigners and natives for the

construction of buildings, it is generally conceded that it would be useless for foreign manufacturers to attempt to place their product on that market because of the extremely low cost of production here. In addition to this the high freight rate charged on bricks to Chinese ports would, it is believed, absolutely bar them from competition. Furthermore, any effort to encroach on this industry would unquestionably be met by a decrease in the selling price, a result easily obtained by reducing the wage of native workmen and making an inferior quality of brick. Chinese-made bricks are manufactured from ordinary clay and are finished in red and blue. The most popular sizes are 5×10×2" and 6×12×2," the former size being the kind used in foreign buildings. There is still a smaller size, which is used in the construction of native buildings. Blue bricks sell for from $50 to $120 Mexican per 10,000, according to the demand, and the red bricks bring from $57 to $130 Mexican per 10,000.

In Shanghai there are two brick works owned and operated by the Chinese, one of which is installed with steam machinery. It may be said that here, as well as throughout central and N. China, the supply of bricks readily meets the demand, and that it is a monopoly with which even Japan would hesitate to compete because of the small returns.

CHINESE PREFER ANCIENT FARM IMPLEMENTS

In the agricultural sections of the entire Yangtse Valley there is practically no use whatever for foreign agricultural implements. The Chinese laborers in the rice and cotton fields, in the mulberry groves, and in the gardens find the Chinese implements of greater utility than any of the foreign, and adhere to them. The Chinese hoe, which contains a much greater weight of metal than the foreign one, being practically a mattock, is, according to their ideas, more serviceable in this heavy soil than the foreign implement. All the ordinary hand implements of agriculture are shaped and constructed according to Chinese taste. Agricultural machinery is not used in this section, even the plow being a great rarity. The Chinese turn over the ground usually with their mattocks. It is harrowed in a primitive way, and when the crop is gathered hand labor does all the work.

Under these conditions it is not strange that the importing firms of Shanghai do not consider it worth while to carry a line of agricultural implements. It is difficult even to obtain a foreign implement for use in the garden of a foreigner in Shanghai. This is the present condition, and to all appearances it bids fair to continue for an indefinite period. In the N. and especially in Manchuria, some agricultural implements are being used; but these are rather the result of Russian introduction than of Chinese desire. The statement was made recently in one of the northern papers that the introduction of modern agricultural implements seemed practically as far off as ever.

INDUSTRY OF DUTCH JAVA

As with 1904, the year 1905 reveals prosperous times in Java, with indications that trade figures for the entire 12 mos. will even surpass those of the previous year. The total imports, January to June, 1905, amounted to $41,595,000, and exports, $58,220,000. The share of the United States in this was $718,500 in goods from and $5,835,500 shipments to this republic. The principal American import to Java is petroleum, which is being crowded out by the product from Sumatra and Borneo. American oil imports for the first 6 mos. were 395,000 cases, while local oil showed 838,000 cases. The latter sells for $1.26 per case, the American $1.40 Flour from the United States was bought to the extent of $9,500 for the 6 mos.

In the list of exports, sugar headed the sales to the United States, with a value of $4,557,000, or double the amount for first half of 1904, followed $467,000 worth of coffee. Other articles for the 6 mos. were damar, $73,000; cassia bark, $70,000; copra, $65,000; rattan $43,000; bamboo hats, $42,000; pepper, $34,000; tapioca flour, $36,000; tapioca, $20,000; nutmegs, $33,000. America bought many other Javan products, such as mother-of-pearl shells, $32,000; kapok fiber, $27,000; cocoa, $23,000; benzine, $17,000; cinchona bark, $13,000; gum copal, $14,000; quinine, $15,000; teak wood, $8,000; pineapple fiber, $7,000; mace, $6,000, and rubber, $5,000.

During the month of February, 1905, a $17,000 cargo with 3,561 tons of benzine (specific gravity 0.7825, at 15° C.) in bulk was shipped from Balik Papan, Borneo, direct to Philadelphia, the first of its kind from the Dutch East Indies to the United States. The result of this venture has been very satisfactory.

A number of American commercial travelers have visited Java recently and have done a satisfactory business, so much so that they intend to return again in order to canvass the place properly.

Batavia has had electric lighting, electric trolleys, and many such modern improvements for some 8 yrs. American companies might have had the contracts for supplying the material for both the electric light company and tramway, as this subject was reported on from the Batavia consulate some time before such contracts were closed. It would have been an easy matter for American electrical engineering firms to have sent their men to Holland, where such contracts were closed, to put in their bids; but they did not do so, and consequently a German firm got the contracts, which paid them well.

Although a number of concessions have been granted by the government in Java within the past year to English and German companies (through their Dutch representatives here) for electric tramways and electric lighting, nothing has come of it for want of sufficient capital. In many cases water power has been proposed, but this has not been considered advisable, as there is only about 6 mos. of the year that sufficient water could be had. The proposition by engineers to overcome this obstacle by damming will not be allowed, as it would interfere with the irrigation works. Another electric tramway is proposed at Padang, Sumatra, but up to the present time work has not been started for want of sufficient capital.

In January, 1906, the government took over the Netherlands-India Telephone Company. No new American firms have established there during the past year, although it is reported that the Singer Sewing Machine Company is likely to open its own agency in Java soon.

RIVER IMPROVEMENTS AT SINGAPORE

Advices from Singapore are to the effect that the special committee appointed by the Governor of the Straits Settlements to consider the subject of the proposed improvements in the Sigapore River, has submitted its report. The governor had requested that the committee would *(1)* select the scheme to be adopted; *(2)* advise as to the basis upon which the riparian proprietors and the proprietors within the whole area benefited should be assessed towards defraying the balance of the cost on the assumption that the government will bear ¼; *(3)* consider whether the benefit to the town as a whole is sufficient to justify a contribution from the municipal commissioners, and, if so, what proportion of the total cost they should be asked to bear. The committee's report is as follows:—

(1) In accordance with the instructions given in colonial secretary's letter P. W. D. 2227|05 of the 14th June, the committee appointed by His Excellency the governor has considered the question submitted to it in connection with the improvement of the Singapore River and has the honor to report as follows:—

(2) With reference to the first question, as to which of the three designs submitted by the colonial engineer on council paper. No 22 of 1905 should be adopted, the committee begs to report that those members of the committee who feel themselves able to express an opinion on that subject *(viz.*, the colonial engineer and the municipal engineer) are in favor of design No. 3 being adopted, if it is found that the results of similar constructions in England and Scotland are proved to have given satisfaction and provided that the tests already made by government afford sufficient indication of the nature of the subsoil.

(3) With regard to the second question as to the basis on which the riparian owners should be assessed towards defraying the cost of this improvement, the committee is unable to come to any decision. It has had lists submitted of all the buildings within easy distance of the river and in the area likely to be benefited by the river improvements proposed. The committee finds itself unable to define with any accuracy the area which should be made liable to the special assessment suggested. Many of the buildings mentioned in these lists though near the river are not at present directly accessible from the river though they may be made so. In other cases their business is not dependent on the river, and they derive no direct benefit from their proximity to it.—It is asserted that some of the Chinese shopkeepers and traders occupying premises on the banks of the river, while admitting that the improvement scheme would benefit the big warehouses, do not consider that they themselves would be benefited by it and do not desire that the work should be undertaken if they are to be called upon to contribute towards its cost. The differences in the nature of the tenure of this riparian property, consisting as it does of freehold and leasehold of varying terms, 999 yrs., 99 yrs. and 63 years, made it practically impossible for the committee to arrive at any equitable or satisfactory basis of assessment.

(4) With regard to the third question, the committee is of opinion that the municipality should not be asked to make any contribution to the cost of this improvement as it considers that this work is necessary for the purpose of increasing the general trading facilities of the port and that its cost should therefore be a charge on the general revenue.

(5) In view of the intimation conveyed in the colonial secretary's letter, Misc. 6333/05 of 1st August, 1905, that His Excellency has no desire to limit the committee in any way, the committee ventures to express its opinion that the revetment of the banks and the deepening of the bed of the river to its full width so as to allow boats to come in and go out at low tide and the provision of sheltered accommodation outside the river, with a view to relieving its congestion, are urgently required. It considers that these works should be treated as an integral part of any general harbor improvement scheme the government may have in contemplation and that the river works should be undertaken at once as the first instalment of any such scheme and should be paid for out of loan.

The committee has come to this conclusion by consideration of the fact that, with the deepening of each section of the river, additional accommodation will immediately become available and the existing buildings will be rendered more accessible, whereas, in the harbor reclamation scheme now under consideration the accommodation proposed for warehouses, being upon reclaimed ground, will not be available for some years even after the completion of the works.

(6) In the colonial secretary's letter, Misc. 6333/05, the committee was asked by His Excellency to indicate some additional courses of revenue to pay for these works if they decided not to recommend any assessment of the riparian properties. The committee is of opinion that this question should be considered as part and parcel of the general question relating to the provision of funds for the improvement of the port.

Signed by J. O. Anthonisz, John Anderson, A. Murray, W. H. Shelford, R. Peirce, and S. Liang Seah.

American Manufactured Goods Shipped to the Orient are Miserably Packed

Everywhere throughout the Orient commercial concerns that handle American manufactured goods are complaining vigorously against the bad and careless packing methods of the exporters in the United States. Consular agents have repeatedly warned the exporters to reform this branch of their shipping methods, through official reports on the subject to Washington, and yet the exporter persistently refuses to heed these warnings. Some mos. ago Special Agent Crist determined to give the matter searching and thorough investigation in the hope of *stirring up* the exporters to a full realization of the flagrant commercial evil they are tolerating, with the result that he sent to the Bureau of Manufacturers of the Department of Commerce and Labor, at Washington, from Tientsin, the great commercial depot of N. China, a report in which he describes at length the manner in which goods are packed in the United States, how they are received at their destination, furnishing illustrations which give emphasis to his description, and which should not fail to convince American manufacturers and exporters of their deficiencies in this particular. The report should also impress the general reader with the correctness of the charges that have so frequently been made and reiterated by American consuls and agents, and the commercial concerns of the Orient, relative to careless American methods in dealing in the markets of the Far East.

There is probably no one thing, says Mr. Crist, in his report, to which American exporters can give their attention that would bring better returns than that of packing. As a general proposition the wood of which they construct their cases is too light in weight. Where ½" stuff is required they will use ⅜". If 1" stuff will insure safe delivery English and German exporters use that thickness, while many Americans select a ¾" or ⅞" thickness. Two cases in point have been brought to my attention within the past few days which showed that the utmost thought, attention, and care had been expended upon the details of packing, but with an evident lack of complete understanding of the strain which breakable goods are subjected in transit to the Far Eastern market. In one instance, by a slight oversight, an automatic piano-player barely escaped complete destruction.

How Not To Pack Glass.—The first instance was that of a shipment from a western manufacturer of window glass. This lot comprised eight packages of opaque or figured window glass in wooden boxes. From the invoice there had been, apparently, 80 sheets of glass placed in flat boxes, each box containing 10 sheets. These boxes or cases were constructed of ⅜" wood on the sides and ⅝" in the ends. The wood was entirely too light in weight and, being of soft pine, was subject to fracture on very slight jar or strain. The sheets of glass were evidently laid in the boxes with loose hay. Hay might have been sufficient if it had been securely woven about each separate sheet of glass. Each box was then carefully wrapped in more hay and the whole encased in a gunny sack.

There was no marking upon the sacks to indicate their contents, and upon ordinary examination they appeared to contain only hay, straw, or other indestructible merchandise. The covering of hay was not thick enough to shield the sides of the boxes from blows and knocks, but thick enough to disguise the presence of the box, and having no strength to sustain weights independent of the slight support given by the fragile box it would have been far better if there had been no such covering and the boxes had been shipped bare, with the cautionary signs usual in shipments of glass or other fragile commodities. Had this been done the boxes would have been stowed in places on shipboard to insure their safety. Instead of that in all likelihood they were placed with other baled and sacked cargo, and from the appearance of the glass it was quite apparent other sacks had been placed on top of them. Under the most favorable conditions these boxes could not have withstood the weight of a single bale of piece goods, and if several thousand lbs. of flour sacks should have been loaded after the eight sacks of glass had been placed in the ship's hold the weight would have completely crushed them. At any stage of the transit these goods were liable to destruction, and it is impossible to state at what stage they were destroyed. Upon opening two of the sacks the boxes were found crushed and the contents utterly destroyed. There was not a piece of glass left larger than possibly 8" or 9" in length, with jagged edges, and varying from 1" to 4" or 5" in its greatest width.

A "Piano-Player" Knocked Out.—The other instance to which reference is made was a "piano-player" from an eastern manufacturer. This machine was carefully and superbly packed in all save one or two details. There should have been placed inside of the piano-player case two blocks of wood, one at each end of the main horizontal piece, which appears to sustain the mechanism of the player, so as to securely support the uprights at its ends and prevent any lateral play. These uprights are of light stuff, sufficiently strong to answer the purpose for which they are meant, but entirely inadequate to withstand any unusual side wrench or strain to which every machine is liable in combined rail and ocean transit. This was one of an order for two players. One was consigned to Peking and arrived in good condition. If this ratio should hold in a larger shipment it would prove so great a financial loss as to cause a discontinuance of further orders.

The upper portion of the right side of the cover was split off entirely, and the middle section of the cover was broken in two pieces. The upright end support on the right-hand side was splintered, the cast-iron arms connecting the bellows and pedals were snapped off, all attachments which were held in place by small screws were torn loose, the small brass angles at the sides of the middle section which contains the music spindle were bent

Courtesy "The Manila American"

ONE OF 100 CASES OF WATCH CHAINS WHICH ARRIVED AT THE MANILA (P. I.) CUSTOM HOUSE IN A DAMAGED CONDITION FROM THE UNITED STATES

FIG. I.—CASE GOODS. WOODEN CASES DESTROYED IN TRANSIT; TIN LINING PARTIALLY DESTROYED

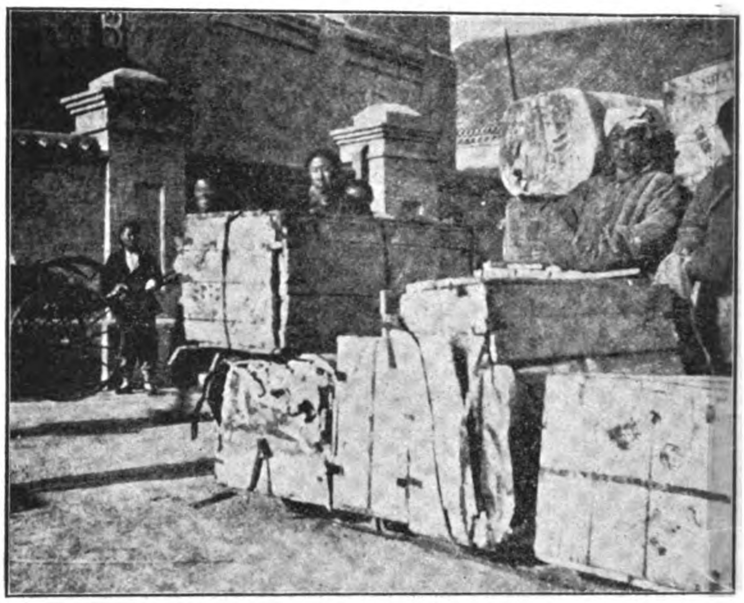


FIG. 2.—CASE GOODS, SHOWING CONDITION UPON ARRIVAL

FIG. 3.—CASE GOODS CONDITION UPON ARRIVAL

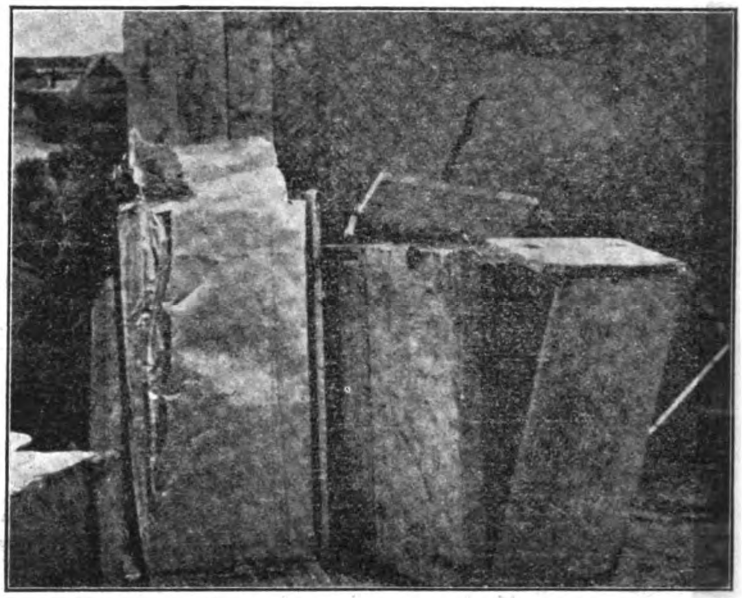


FIG. 4.—CASE GOODS CONDITION UPON ARRIVAL

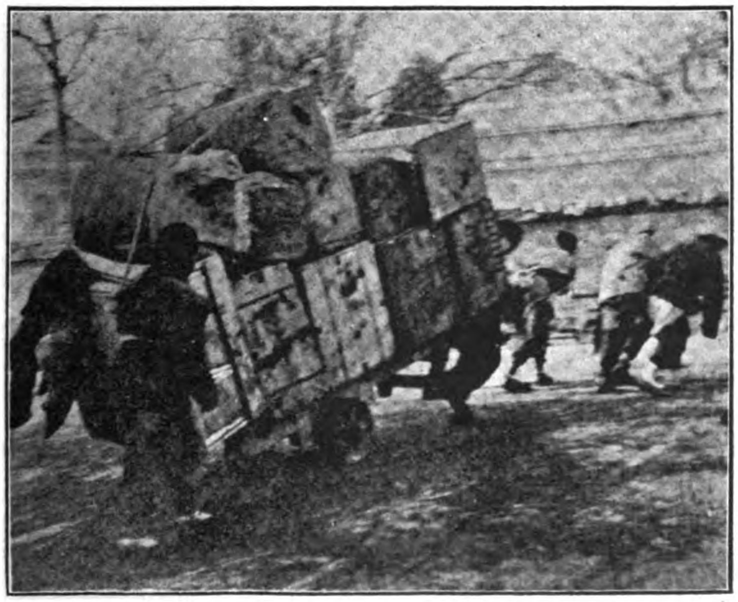


FIG. 5.—CASE GOODS AND BALES OF AMERICAN GRAYS

FIG. 6.—JAPANESE YARNS. CONDITION UPON ARRIVAL

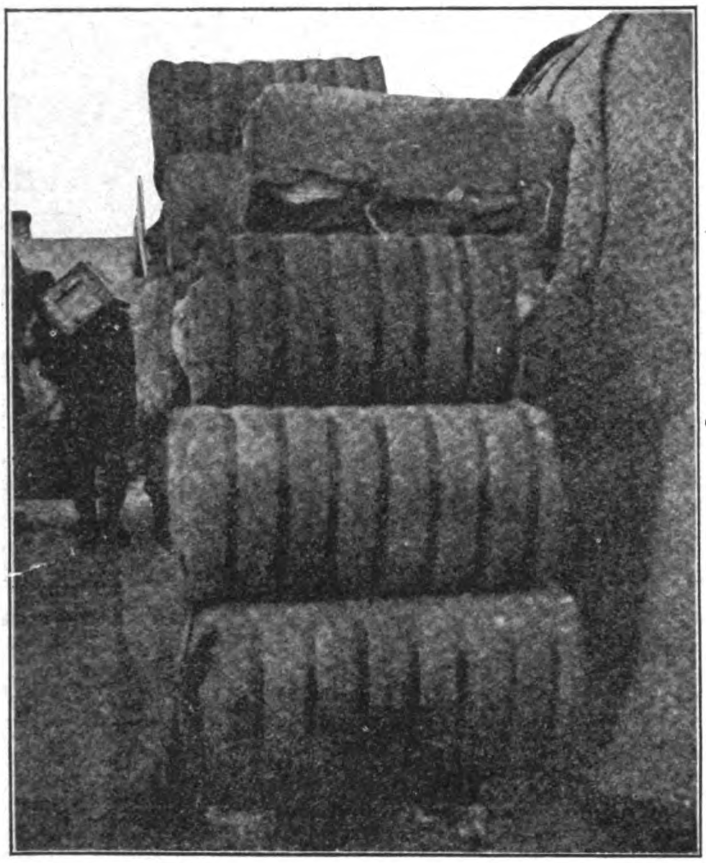


FIG. 7.—AMERICAN PIECE GOODS METAL-BOUND; ONE BALE TIED WITH ROPE

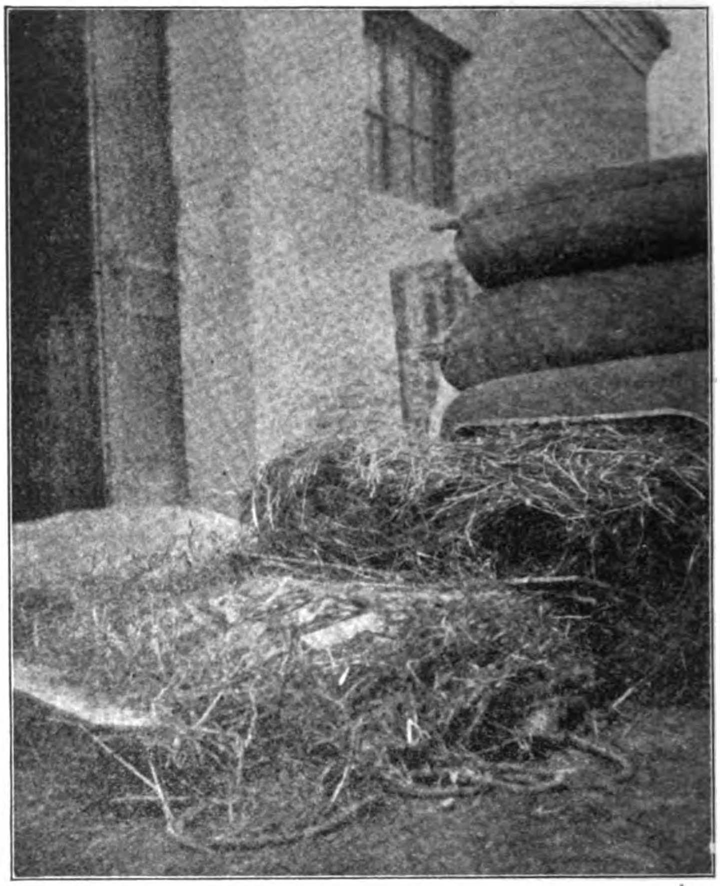


FIG. 8.—SHIPMENT OF WINDOW GLASS FROM THE UNITED STATES

and broken loose, a piece was chipped out of the flange on the right-hand end of the roller, and the iron T shaped casting was broken at the point indicated by the dotted line. This casting carries the shaft, which was badly bent, by which the roller is moved. Besides these injuries, the right-hand door was jammed back and caught upon some obstruction which dug into its surface, and the wooden guide to the hammers was broken into five or six pieces.

This situation can be avoided in the future by removing the pedals and placing them in a separately constructed compartment nailed in some suitable place inside of the packing case. To prevent lateral motion of the mechanical parts two blocks of wood could be properly fitted snugly into the spaces between the casing and the upright supports to the cross piece carrying the operating parts of the player.

PACKING OF HABERDASHERY. — English underwear, haberdashery, and miscellaneous articles of clothing are packed for shipment in boxes or cases of 7/8" stuff, having tin linings made to the exact inside measurement of the box. Inside of the tin lining heavy wrapping paper is placed, in which are packed the bundles of different articles. These articles are wrapped in attractive paper packages or in pasteboard boxes containing ½ doz. each of such articles as hosiery, gloves, etc. Each package is properly marked, giving clearly and plainly the number, size, and name of the contents.

Cases containing an assortment of different articles have the different kinds packed in boxes having distinctive color marking, as white, blue, green, black, red, denoting socks, stockings, and underwear of different qualities, or they may be distinguished by being decorated with cheap but attractive lithographs. This facilitates the examination by the customs officials. An examination of one case of goods packed in this manner is sufficient to pass the entire shipment. When the case is packed by the exporter at the point of shipment, the top of the tin lining is securely soldered, so as to be water-tight. That this is a most necessary precaution in all shipments other than gray goods is evident upon examination of shipments of goods arriving daily with their battered and crushed cases. In many instances only the tin case is left intact upon

FIG. 9.—AMERICAN PIECE GOODS AND NATIVE GOODS EN ROUTE TO THE CHINESE OWNER

FIG. 10—TRUSSES OF AMERICAN PIECE GOODS IN DAMAGED CONDITION

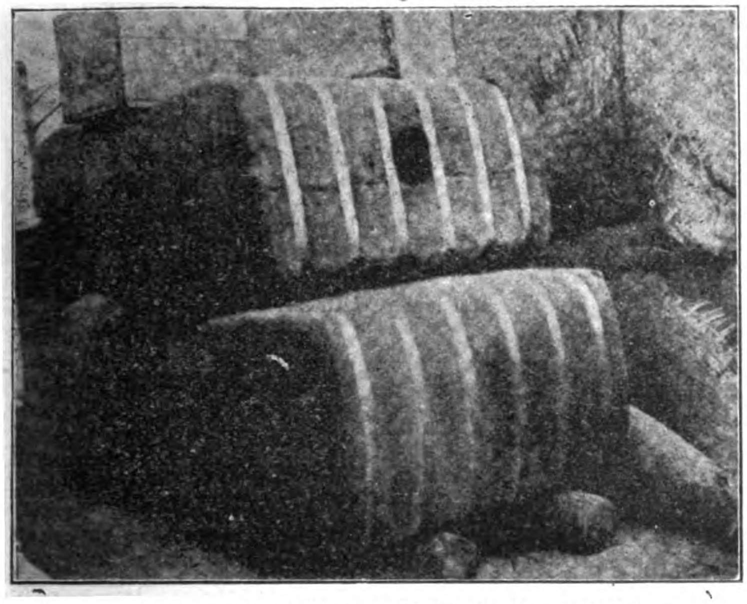


FIG. 11.—BALES OF PIECE GOODS FROM HOLLAND

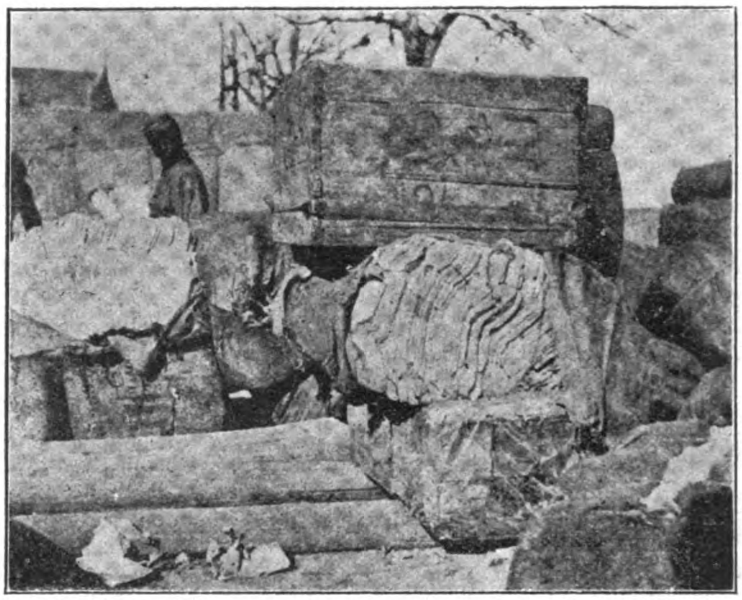


FIG. 12.—PIECE GOODS. BENEATH PIECE GOODS ONE CASE OF GOODS WITH ONLY TIN LINING REMAINING

arrival, and this is frequently so damaged as to expose the goods to the elements. The most careful packing is not always able to withstand the rough treatment given by the coolies who load and discharge the cargoes at these ports.

ILLUSTRATIONS OF BAD PACKING.—These pictures are not exceptional samples, but are of cases which had evidently been made and the goods packed by men deemed competent for the work. They happened to receive a greater portion of smashing, tumbling, and crashing than the others of the same kind containing like goods, and as a result succumbed in the degree shown by the photographs.

No. 1 present a view of the tin-lined case partially destroyed and the only remaining protection to the contents. The wooden outer case was destroyed in transit.

Nos. 2 to *5* show the damaged condition in which many wooden tin-lined cases arrive in Far Eastern ports. All of the photographs were taken before the goods had been received by their purchasers and presented this appearance before passing through the final one or two handlings to which they are still to be subjected.

The addresses upon bales and boxes arriving from Europe and England are in large bold-faced type, and the cases seldom exceed 5′ in length or breadth. The boxes are bound with heavy strap-iron binding on their edges, while the ends are doubly supported by cleats with short strap irons fastened to the ends and running over the edges to the sides. The iron straps on packages arriving from America in many instances appear to have seen service in previous shipments. This increases the liability to breakage and the practice is to be deprecated. The German method of packing goods similar to those above alluded to differs from the English only in that they use oiled-paper lining to the tin box instead of plain paper.

The illustrations *Nos. 6* to *12*, inclusive, indicate the condition of various goods from different countries upon their arrival at Tientsin. These pictures were taken as the bales were seen upon the customs landing, and are in each instance described to illustrate a particular point or comparison.

No. 6. Japanese yarns in bales of 400 lbs. net. The markings upon these bales always show up clear and distinct, both in Chinese characters and in English. The iron straps are heavy and broad and the angles of the bales are supported by stout boards or sections of bamboo poles, giving greater protection to the contents in transit. Bales thus prepared are not often broken, the percentage being quite small.

No. 7. American bales of piece goods, bound by metal bands, which arrived in good condition with but slight abrasion or tearing, and a rope bound bale with but two ropes remaining out of the original nine. This bale arrived at its destination without further damage, but the goods were in an unprotected state and required careful handling.

No. 8. Shipment of window glass from the United States.

No. 9. American piece goods *en route* to the godown of the Chinese purchaser, showing method of trucking and the large loads hauled by Chinese Coolies.

No. 10. There are eight trusses of goods in a more or less dilapidated condition. This is a typical load, illustrating the average condition of the American truss. In almost every instance the ropes have all been removed, and if three of the iron straps remain which bind the two bales that is looked upon as a favorable shipment.

No. 11. Bales of piece goods arriving from Holland. The heavy iron straps insure in most instances arrival in good condition.

No. 12. This illustration shows indiscriminate piling together of bales and cases in a more or less damaged condition. The wooden case on the bale of piece goods is slightly damaged, but as it contained a tin lining little if any damage resulted to the contents. The condition of the bales of piece goods is too apparent to need comment. The bottom package of the three in the foreground was a case of white goods, the wooden case entirely gone and the tin lining which remained was broken open on the upper angle of the end. The goods were much soiled when the photograph was taken.

At the time of the exposure The Bund at Tientsin was literally strewn with damaged bales of Am rican piece goods. There must have been at the lowest estimate 500 in the immediate range of vision and the greater part were torn, soiled, and in bad shape generally. Those in the best condition were bound with iron straps, while the rope-tied bales suffered the most.

JAPAN'S FUTURE PLANS

The joint efforts of the chambers of commerce of Japan to inaugurate a system, which, if adopted, will secure industrial and commercial success, seems to be broad in their scope. The following items are a gist of resolutions passed by a body made up of representatives of the empire's commercial organizations, the first set in the series dealing with foreign trade:—

Matters Relating to Foreign Trade.—(1) Extending and completing works on custom-houses, and improvement of treaty ports; *(2)* establishment of commercial and industrial commissioners' offices in the most important foreign ports; *(3)* improvements in and extension of consular service urged; *(4)* improvements in the present method of sending trade industrial students abroad urged; *(5)* to establish the service of cruising floating museum, and commercial museum, and bazaars of sample halls at the important foreign ports most likely to be Japan's new customers; *(6)* to abolish the conventional tariff; *(7)* to make customs alliance with Korea; *(8)* early conclusion of a better commercial treaty than the previous one with Russia; *(9)* lowering the import duty on raw materials.

Matters Relating to Manufacturing Industry.—(1) Encouragement on the part of the government to manufacturing industry by subsidy of by protective policy; *(2)* to expand the industrial laboratory and to encourage the establishment of model factories, and to give subsidy to such established factories; *(3)* to establish more schools of technology and of commerce, and to encourage the establishment of apprentice schools, and to give subsidy to same; *(4)* to open a world's fair.

Matters Relating to Transportation.—(1) To build more railways, and to complete the already planned lines immediately; *(2)* to increase steamship lines with government subsidy; *(3)* to complete works connecting the sea and land transportation to give better facilities; *(4)* to control all the railroads of the empire as to their business methods, etc.; *(5)* to better (lower) both the railway and marine freight rates; *(6)* to expand the present telephone service.

Matters Relating to Finance and General Economics.—(1) To economize the administrative expenditures; *(2)* to ac ıst the taxation: *(a)* either to abolish or wer war taxes injurious to trade or manufacturing prosperity, such as stamp duty on checks, import duty on rice, cocoons, consumption tax on fabrics; *(b)* government monopolies, such as tobacco, salt, camphor, are desirable neither as a government resource nor as bettering the industry. Salt monopoly, first of all, should be abolished as soon as some other resource is found; there sould be no other government monopoly; *(3)* redemption and consolidation of public land; *(4)* to give every possible caution to check the overflow of circulating currency; *(5)* to better the money market; *(6)* to consolidate the banking houses of the empire; *(7)* immediate establishment of Japanese-Chinese Bank.

SHANGHAI'S ELECTRIC TRAMWAY SYSTEM

At the statutory meeting of the Shanghai Electric Construction Company, Ltd., held recently at the office of Messrs. Dent Bros. & Co., Gracechurch-st, London, Sir Alfred Dent, K. C. M. G., presided. The company, which has been formed to carry out the contract made by the Municipality of Shanghai for the construction of electric tramways, it would appear from the proceedings, has lost no time since it was registered in getting down to business. At this meeting a very encouraging account of what has been done in the short time at disposal was given by the chairman, an old resident of Shanghai, and one who is acquainted with the situation there. In his address to the shareholders Sir Alfred said:—

The Municipal Council and ratepayers of Shanghai having come to the conclusion some years ago that tramways had become a necessity for the place, tenders for a system were advertised for to be sent in by March 31st last. Messrs. Bruce, Peebles & Co. were successful in the tender and in obtaining the contract. You will bear in mind, therefore, that this company has been started not as a speculation, but to carry out the requirements of the Municipal Government of Shanghai. In this statutory report there are, of course, no accounts to lay before you, except the statement of the number of shares allotted, the cash received, and an abstract of receipts and payments on capital account to date all of which are given in the statement, which has been circulated amongst you. The charges are the usual charges—underwriting, brokerage, etc.—that are usual and inevitable in enterprises of this nature. The amount of share capital so far received, you will have noticed, is £63,100. Of that, £25 000 have been paid to the contractors. There is also a loan of £5,000 to the contractors, which may possibly call for some explanation. It refers to the deposit which they had to make on signing the agreement with the council at Shanghai on October 10th last. The contractors claimed that this deposit should have been paid by the company on taking over the concession; but eventually it was arranged that we would find the money in the form of a loan to Messrs. Bruce, Peebles & Co. It lies with the Hongkong and Shanghai Bank, bearing interest, and will, of course, be returned to us on the completion of the contract. There are other items as detailed, of £1,000, £15,900, £1,953, £2,500, and £2,100, which are all payments in accordance with the agreements and the prospectus. Though two agreements with the Shanghai council were signed in Shanghai on October 10th, they did not arrive in London until December. The contractors, however, anticipating the receipt and contents of these agreements had already made considerable contracts in reference thereto. The greater portion of the rails have been shipped, and have already arrived in Shanghai. Contracts have been entered into in Australia for necessary wood pavement, and further shipments are being made of poles, tools, and other necessaries. You will therefore understand that no time has been lost as far as the contractors are concerned in getting the work in hand as rapidly as possible. The council has to reconstruct the Garden Bridge over the Soochow Creek, and to strengthen other bridges elsewhere; it has also to provide additional motors and machinery to supply the power we shall require, and we hope it will be ready with its additional plaut and bridges in good time.

As to the probable success of tramways in Shanghai I would observe that most of your directors have an intimate knowledge of the place, and that many present residents and old residents have taken shares, and I may say that we are all very confident that the company will prove a great success owing to the facilities for construction and working and to the large and industrious population that is concentrated in Shanghai, We depend largely on the Chinese for our revenue, the people who form the great bulk of the population, and it is very satisfactory to us to read so constantly in the newspapers how the Chinese flock to railways wherever they have been introduced, and we anticipate that our tramways will have a similar attraction for them. The streets in Shanghai are narrow in many places, which necessitate small cars and a narrow gauge. Our cars are, in fact, under the agreement with the council, built to carry only 32 passengers These narrow streets will, I think, be of one advantage to our company, and that is they are wholly unadaptable for competition by motor buses.

Negotiations have been under consideration for some time past to extend the tramways into the French Concession, and Chinese City and native quarter. These, however, are temporarily suspended as far as the Chinese quarter is concerned. The Taotai of Shanghai has lately been much absorbed in other matters which have led to a quasi riot, over what is known as the Mixed Court affair. These disturbances seem now to have been settled, the China Association having recently received a letter from the Foreign Office, dated February 6th, which concludes with the following paragraph:—"The arrangement arrived at by the consular body appears to Sir Edward Grey to be entirely satisfactory." You will notice in the papers, especially from America, that there had been rather unfavorable telegrams referring to China, and no doubt a good deal of friction is going on over the boycott of American goods, and this extends throughout China, including Singapore and Hongkong. Shanghai is not more affected that any other part in China, and I do not anticipate any disturbance there that cannot be easily dealt with. The population of Shanghai is largely made up of business men, both Chinese and foreigners, and it does not suit business men, whether Chinese or foreigners, to have disturbances. I asked the contractors to give me some particulars as to how they viewed the position and progress of the works, and Mr. Portheim has written me as follows:—"Approximately £60,000 worth of plant has been shipped, although the company has only gone to allotment 6 weeks ago. The ground has been broken in Shanghai, the contractors' engineers have all arrived, and are busy organizing the various gangs of workmen preparatory to handling the material which has just arrived at the wharf. We anticipate, therefore, no difficulty in completing the actual tramway construction in 12 mos. from date, and the service should be running in about this period if the municipality hurry up and attend to its portion of the work."

Messrs. Harper Bros. & Co.'s report, alluded to by the chairman, states that the contractors have made very quick headway with the preparation of their plant for this work. The contract for the construction was signed on December 11th, 1905, and on November 23d, the first shipment of rails took place for Shanghai. The whole of the cables is well in hand and nearly all of the poles have been constructed. The urgency of persuading the Shanghai Corporation to take active steps towards the construction of the two bridges was pointed out, and it was also noted that tenders have been called for for the increase of the Shanghai power-house, so that there should be no delay in receiving power from that station.

PHILIPPINE RAILWAYS

Commissioner W. Cameron Forbes, Secretary of Commerce and Police, has been quoted as saying that the construction of the railroads on the Islands of Panay, Negros, and Cebu will, in all probability, begin simultaneously. Government engineers have made a careful survey of the Island of Panay from Iloilo to Surpen, and the probabilities are that this survey will be adopted by Messrs. J. G. White & Co , who are to build these lines, as the route of the railway on Panay. The exact location for the lines on the other islands can not be definitely announced until after the contracting firm's engineers have made their survey.

Much of the future success of these lines will depend upon the routes along which they will be established. Those who are directly concerned say that the Danao River, near Escalante, Negros, presents possibilities of harbor development which would make it one of the finest ports in the archipelago. All that is necessary is the dredging of a small bar or the blasting out of a small coral reef. The railway will, in all probability, run for 10 to 20 ms. inland, from this point, following, in general, the shore, first to the N. and then to the SW. It is not known at this time whether the line will touch Bacolod, as there is no harbor there, but it is likely that it will reach some deep-water harbor at the SW. terminus, which will be located somewhere near San Juan de Ilog of Himamailan.

This line will not begin to develop the ultimate resources of Negros. The largest body of the island is at the SW. end, which will be untouched by the proposed line, as will also be the case with reference to the great fertile slopes of the SE. coast which lies facing the Island of Cebu. It is hoped, however, that eventually the road will extend, following the same general plan along the coast, and that a branch will cross the island making the Harbor of Bais its final terminus.

Cebu is probably the most densely populated island of its size in the archipelago. Its railway will run up and down and probably close to the coast. The route will be so surveyed that the capital of the province, the Pueblo of Cebu, will be close to the center of the line. It is likely that construction will begin at Cebu because of that town's fine harbor facilities, and be pushed rapidly in both directions—NE. and SW.—until it reached Danao or Carmen on the N., and Argao on the S.

The proposed lines across, or traversing the islands E. and W., are optional with the contractors, and probably will not be built immediately, although it is thought highly desirable that ultimately all these lines will connect the E. W. coasts of the three islands, as the change of monsoons makes material communications along one of the coasts very difficult for small coastwise vessels during one-half of the year. Hence, the ability to cross the islands by train should prove a great and general factor in the development of the country. This is particularly true in the case of the Island of Luzon. The great problem of Panay will be the N. terminus. The specifications call for two lines—one to Capiz, where the population is centered, and one to Bataan, where there is the best opportunity for a harbor. Until the surveys are made of the latter branches, however, it will be impossible to predict the engineering difficulties that may be encountered.

Another very interesting feature of this railway construction problem is the question of a desirable route across the Island of Luzon from some desirable Pacific Ocean point to Mabila. Commissioner Forbes, accompanied by General Manager Higgins of the Manila Railway Company, Ltd., and others, has just made a trip to the E. coast of Luzon in search of a desirable Pacific Coast harbor and to study the country with a view to connecting the prospective harbor with Manila by the shortest and most available railroad route. The party went to Taytay over the Antipolo extension of the Manila & Dagupan Railway and from there by launch to Sinaloan, a port on the NE. coast of Laguna de Bay. From there it proceeded overland to Binangonan, a point almost directly E. of Sinaloan and opposite the Island of Polillo. At Binangonan the party was joined by Colonel Fisk, C. E., U. S. Army, in charge of the insular Bureau of Port Works, and crossed over to the Island of Polillo where the large coal deposits were investigated. Then the coast was explored with a view to harbor facilities. The distance between Binangonan and Manila, as the crow flies, is about 50 ms.; around by the San Bernardino Straits, it is about 600 ms. The apparent intention of the government is to locate the Pacific Coast terminus of the line as close to the Polillo coal deposits as possible with a view to the more rapid development of the mines.

Taken altogether the preliminaries of railroad construction are going ahead apace, a condition which is most satisfactory to everybody who are desirous of industrial development.

MISFORTUNE TO A GREAT MINE

The Champion Reef Gold Mining Company of India, says *St. James's*, has for some time past taken the premier place amongst the mines working in the Kolar District of Mysore. For years it has crushed nearly 20,000 tons per month, and the gold produced has reached nearly £70,000 per month. Dividends have recently ruled steadily over 100 per cent., attaining as much as 165 per cent., and under the influence of these mounting distributions the price of the shares rose rapidly in the market. Twice did the directors split them, first into 10*s*. shares and then into 2*s*. 6*d*. shares, in order to make them less awkward to deal in, and the result has been that the £260,000 of capital has been converted into 2,080,000 shares of 2*s*. 6*d*. each, and so favorably was the mine considered that at one time these 2*s*. 6*d*. shares were quoted 35*s*. each, representing capitalization of £3,640,000. With such an excellent record behind it, considerable regret was expressed at the fact that the directors have had to issue a circular announcing that the ore opened up in the mine recently not having been so rich as that developed of late, they have decided to curtail the quantity of ore sent to the mills by about 3,000 tons a month. This is, rougly speaking, ⅙ of the average output, and presumably the returns will diminish to this extent, while the profits may suffer still more.

RAILWAY PROBLEMS IN MANCHURIA

It is evident from accounts received from Manchuria, says a Peking letter, that Japan will have to spend much money on railway betterments before her principal holding is of much value. The first great question, naturally, is whether the Japanese will change the narrow 3′-6″ gauge to the 4′-8½″ standard gauge. If they make this change, in addition to all their other expenses they will have to invest at least £1,000,000 in providing entirely new rolling-stock to replace that which they borrowed from their own railways in Japan. I am very sceptical about this being done, because there are a number of other very heavy outlays which will have to be at once entered into.

The first of these, and one of the most expensive, is the replacing the embankments, bridges, culverts and rails between Changtu and Kungchuling. The Russians utilized the ample time given them by the slow Japanese advance to rip up a 50 m. gap on the railway and to carry all the rails and steel work far back into their own bases. It is this gap beyond the Japanese front which will have to be mended at Japanese expense. From a £250,000 to £500,000 will be necessary for this.

The second expense is the repairing and re-building of stations, and the repairing and improvement of the godowns and railway property. This, if carried out along the whole 450-ms. of the main line, will necessitate the disbursement of another £500,000.

The third expense is the completion and improvement of Dalny, which must be attended to, since unless this Russian failure can be turned into a Japanese success within 2 or 3 yrs., it will be a white elephant in the government's hands. This expense then must be entered into without delay. The most conservative estimates hold that another £500,000 will have to be put into Dalny at once, and a further £500,000 expended slowly during the next 5 or 6 yrs.

The fourth expense is the development of the railway coal mines. There are three of these mines: The Fushun, the Yentai, and Wafangtien. Of these three, under the Russian regime the second mine, the Yentai, was the biggest producer, but the Japanese have already shown a strong inclination to push the Fushun mine and to look after the other two very slightly. If they develop the three simultaneously in order to make coal one of the great articles of freight, a further £500,000 will have to be sunk in machinery and installation of improved appliances.

Thus making the trunk-line a standard-line; completing the gap made in the N.; repairing and rebuilding stations and railway properly, modernizing the Port of Dalny, and developing the coal mines and giving them improved appliances and rolling-stock, will absorb a sum which may vary from £2,000,000 to £4,000,000, according to the thoroughness with which railway affairs are attended to. With all this additional money sunk in Southern Manchuria the Japanese Government will have to strain every nerve to make the railway a paying proposition. How will it act?

There can be no doubt that large quantities of coal will be moved down the line regularly, as soon as the evacuation is complete, and that the export of coal from Dalny will be attempted on a very large scale during the winter months. The Fushun mine is at present producing 1,000 tons of coal a day. It is not too much to expect that the various coal mines will be placing 3.000 or 4,000 tons of coal at the pit-heap a day, in less than a year's time, and that half of this amount will be available for export. It is quite certain that Dalny will be the principal shipping point, and that coal will flow from here all over the N. Far East. This will be one source of profit.

The large number of trucks which will be constantly entering Dalny will be able to allow return freight of a coarse kind to travel back to the vicinity of Moukden for next to nothing; and therefore people must be prepared to see the Japanese Government offering the very greatest inducements to its subjects to settle in Dalny, and from there to conduct the import trade of Manchuria to the detriment of Newchwang.

Then it must be remembered that at Ta Shih-chiao, Liaoyang, Moukden, Tiehling, Kaiyuan, and Changtu, the government will be able to lease to its own people the immense military godowns constructed by both the Russians and the Japanese—places which can be turned into excellent depots for the collection of Manchuria's raw products and the shipment to the seaboard. All this will be in purely Japanese hands and, *pace* the cry of the open door, no others but Japanese need apply for floor space. Japanese banks established at all these centers will give the best possible facilities to their own people; and therefore, with godown-room, financing and goods-carriage in her own hands, Japan will attempt to create one of those hide-bound monopolies which a study of her present condition shows that she dearly loves.

That, of course, is only one side of the picture; for it remains to be seen how much the competition of the purely Chinese railway' on the other side of the Liao River, will tend to diminish the profits of this subtle speculation.

ELECTRIFICATION OF SINGAPORE

When the presently existing scheme of electric tramways for Singapore was first mooted, says *The Straits Times*, one of the factors which led the Municipality to receive the project with favor was that it would give them opportunity to secure for the city a supply of electric light without going to the expense of laying down an independent installation. The cry for *more light* had for long been ringing in their ears. Citizens clamored that the lighting facilities of Singapore should be up-to-date and progressive like those of other cities in the East. The coming of the electric tramways brought relief. Stipulations were made that the tramway company should supply electric current from their power station in McKenzie rd. at a stated price for public and domestic purposes, the price so stipulated being 18 c. per unit up to a limit of 500,000 units with a reduction of 25 per cent in cases where the energy is required for motive purposes.

Simultaneously, therefore, with the work of constructing the electric tramway company, the municipality has been engaged in laying a system of mains for street and domestic lighting all over the town. The first intimation that the public got that it was nearing a realization of this much-needed addition to the lighting facilities, was on the occasion of the last birthday ball, held in the newly-completed Victoria Memorial Hall, which was lit up by electricity supplied through the municipal sub-station, adjoining the Adelphi Hotel. At that time the system was by no means in a complete state of preparation, but by dint of special effort it was made to serve, and it did credit to both Mr. J. H. Mackail, municipal electrical engineer, and to Messrs. Howarth Erskine, who put in the installation. Since that period continual progress has been made in perfecting the supply system, and on Tuesday night the first real and practical supply of electric current for private consumption was turned on. There was no ostentatious ceremonial about its inauguration. Indeed, the event might have been looked upon as insignificant were it not for the fact that it marks a very important epoch in the municipal progress of Singapore.

Excellent Results Obtained.—At the municipal sub-station in Coleman-st. is placed the delicate apparatus which receives the current from the power station and distributes it according to voltage required all over the town. The machinery has been erected under the supervision of Mr. Mackail, and is of the most modern description. Its running trials on Tuesday gave excellent results. One of the buildings among the first to be lighted up was the Waverly Hotel in Hill-st. which looked very well indeed under the brilliancy of the lamp. Here the installation was put in by Messrs. Howarth Erskine. Another place which first got a supply of current for practical purposes was the palatial residence of Towkay Seah Peck Seah. Here the installation is by Messrs. J. Bertram Kinsey and it includes fans as well as lights all over the mansion. The results obtained here were also excellent.

In a very little time we should see a vast extension in the use of electric lighting in Singapore now that the municipal mains are available, and before long the completion of the street lighting may be looked for. Singapore Club installation is all but ready, and the Adelphi Hotel and other central buildings will soon be using this modern illumination. There is a feeling among a good many that the rates charged by the Municipality are too high; but this matter will no doubt right itself in time, and we believe that a reduction in prices is already contemplated.

Apropos of electric lighting, we learn that Messrs. Howarth Erskine have secured the tender for putting down the installation in the Penang town hall and theater.

CHINESE LABOR FOR PANAMA

Vernacular papers of China say that Minister Rockhill has communicated to the Wai Wu Pu, at Peking, a proposal of the Panama Canal Commission to engage coolie laborers from China for the Panama Canal construction. The terms of the contract for these laborers will, it is stated, be similar to those for the recruits to the Transvaal, and the admission of the coolies will not be effected by the exclusion laws of the United States. The Chinese authorities are requested to make this information generally known so as to preclude the possibility of obstruction to such emigration. This request the board has accordingly communicated to the viceroys of Chihli and Kiangsu provinces.

NORTHERN MANCHURIA

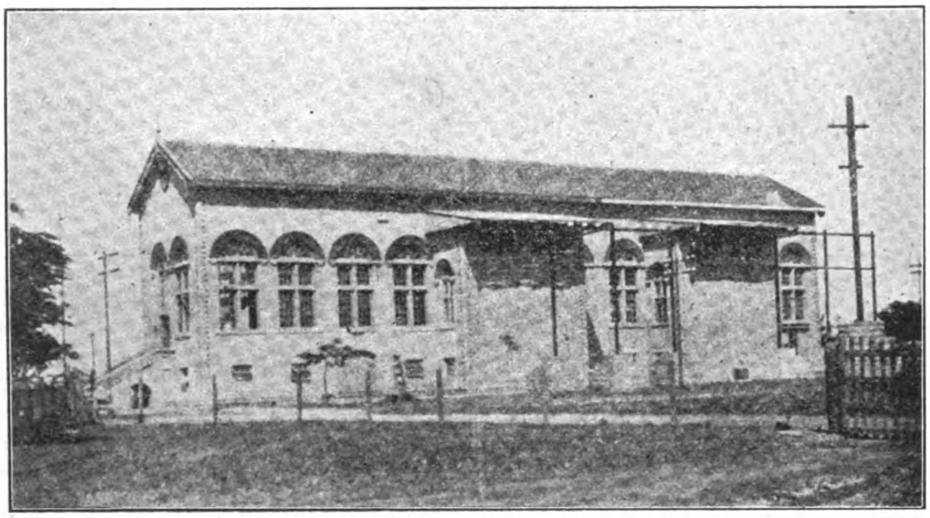
The so-called Chinese mines of N. Manchuria, says the *China Review*, about which there is some talk, would probably neither be rated as mines by English engineers, nor pronounced by them paying propositions. They are all placer mines, that is, alluvial deposits which have been worked over for many years past by hand, and which could not be exploited profitably with the aid of modern machinery. In every case where the deposit is a rich one, the Chinese authorities have practically worked out the best land. Thus the Moho mine, about which there is most talk, has been worked without a break for nearly 20 yrs. by the Chinese, until the gold production has sunk to a very small amount indeed. Formerly it may have been possible to take £500,000 sterling of precious metal from these washings; to-day, if Chinese information is to be believed 1/10 of that sum cannot be extracted annually. The idea, then, that Russia desires to annex riches as fabulous as those of Golconda is merely fantastic.

And in timber-felling as in mining. The building of the Manchurian Railway has allowed the mountains covered with virgin forests (which are interposed between the Sungari plains and the Primorsk) to be eaten into. But the supply of timber in these northerly latitudes is practically inexhaustible, and the value which wood has in settled countries does not exist here. Placed many hundreds of miles away from any sea-board, with the scantiest population living near, these Manchurian forests internationally cannot have the same value as, for instance, the Yalu forests, whose trees are carried by water to the sea. A timber-felling concession is intrinsically of small value therefore in the Kiria Heilunchiang provinces. Russia has as much timber along the Amur as she will be able to cut for hundreds of years, and Manchurian supplies can be merely useful for local work.

LARGEST HYDROELECTRIC INSTALLATION IN SOUTHERN ASIA, MYSORE PROVINCE, INDIA—III

(By A. C. HOBBLE.)

The standard line construction makes use of composite poles consisting of a heavy 7" wrought-iron socket 13" long with a 7×7" Australian jarrahwood top which is 17' in length and is let into the iron socket a distance of 21", thus making a pole 28 ¼' long. The poles are set 6' into the ground and are spaced about 130' apart. The two Kolar transmission lines, consisting of 1/0 B. & S. copper wire arranged equilaterally with 40" between wires, run parallel 60' apart and are supported on white porcelain insulators of Italian make having five *petticoats*. Iron pins are cemented into the insulators with Portsland cement, and it has been observed that this is one of the causes of an occasional cracked insulator.

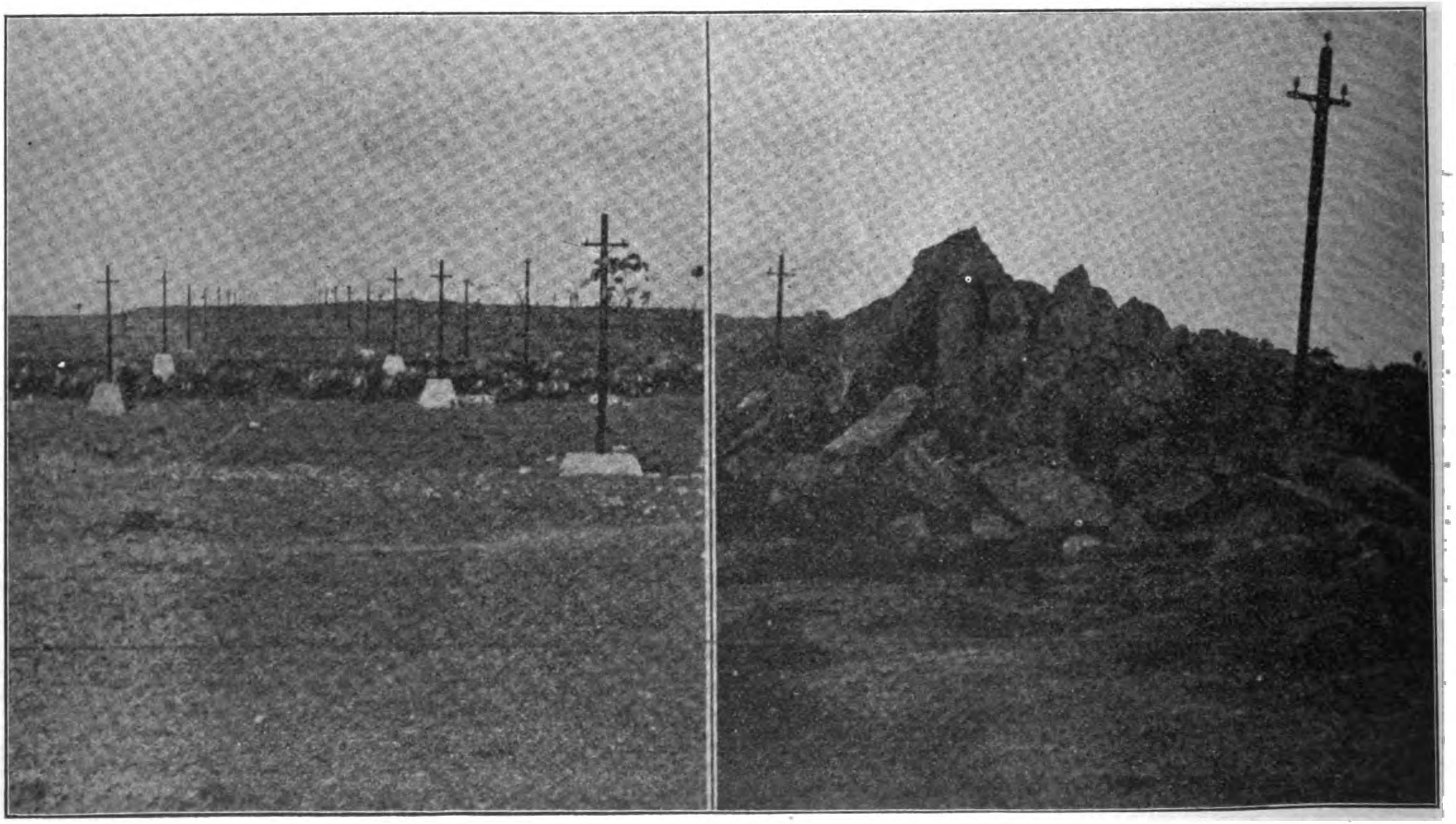


STEP-DOWN TRANSFORMER STATION SHOWING THE TWO TRANSMISSION LINE ENTRANCE TOWERS—KOLAR GOLD FIELDS

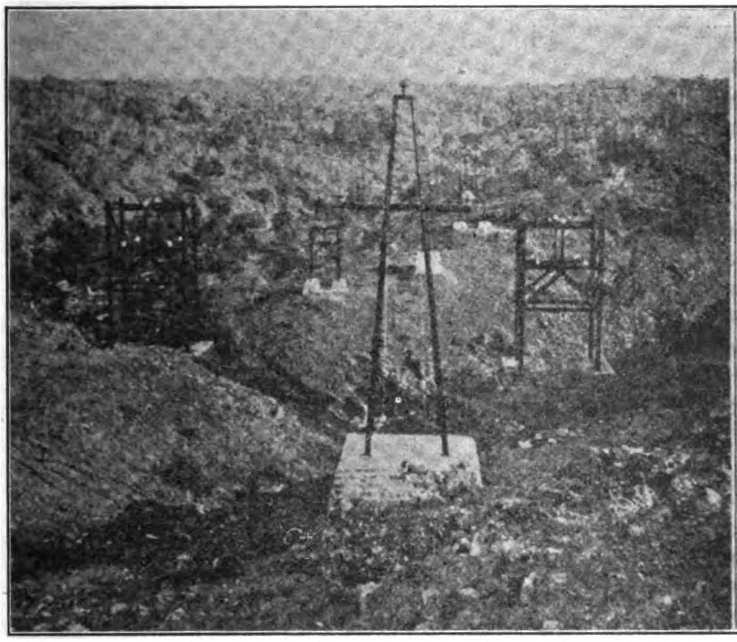
Poles Rendered Unserviceable by Lihgtning Strokes.—Several poles have been rendered unserviceable by lightning strokes. This climate is very severe on wood exposed to the sun—causing *dry rot*—it being undoubtedly advisable (taking also the destructive white ant into consideration) to use iron poles and crossarms. The slight advantage to be obtained by the use of wooden poles is more than offset by the trouble and cost of necessary renewals and their short life as compared with iron poles.

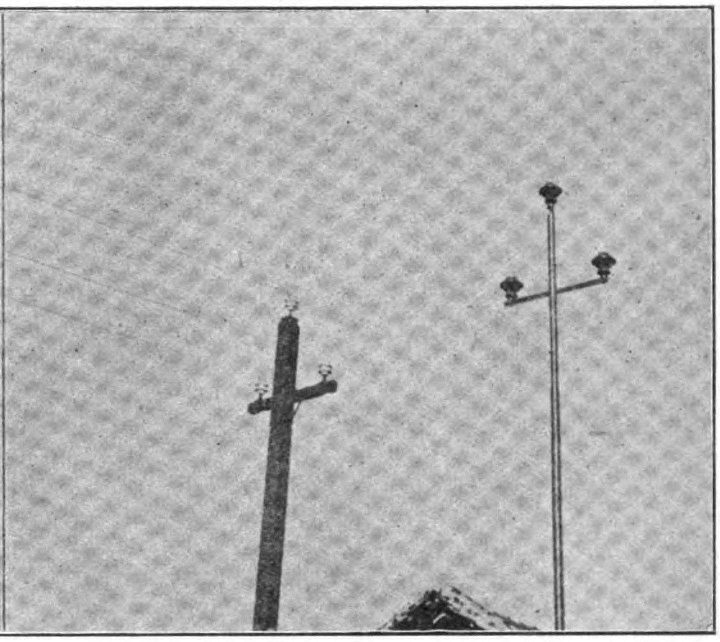
Profiting from the experience of using wooden poles and porcelain insulators with cemented iron pins on the two Kolar transmission lines, it was decided to use wrought-iron poles with iron crossarms, and high-tension insulators with wooden-headed pins in the construction of the Bangalore-Sivasamudram transmission line. This line is 62 ms. long and is composed of No. 5 B. & S. copper wire supported equilaterally 40" apart on Locke brown porcelain insulators. The latter are 11" high and are divided into three sections cemented one into the other. Each section forms one *petticoat*. The diameter of the large umbrella-shaped *petticoat* of the top section is 11", the middle *petticoat* is 6" in diameter, and the bottom *petticoat* 5½". An accompanying photograph illustrated the two types of insulators mounted on poles, the larger one being the Locke insulator. The latter has been tested at 100,000 volts at the factory. Thus provision has been made, by the use of these high-voltage insulators, for a future increase of the line pressure should occasion require.

Lines Parallel Each Other.—The Bangalore line runs parallel with the two Kolar lines and at ⅓ of the distance between them as far as Kankanhalli Station. This spacing leaves ample room for a fourth transmission line. The poles are cylindrical, hollow, with ¼" thickness of metal, and are divided into three lap-welded sections measuring 6', 8', and 14' respectively, and with outside diameters of 3", 3½", and 4". The total length of the pole is 28'. The crossarm is a 2½×2½" angle-iron about 44" long. The insulators



TRANSMISSION LINES CROSSING LEVEL AGRICULTURAL COUNTRY, AND A BIT OF THE ROUGH COUNTRY—BETWEEN SIVASAMUDRAM AND THE KOLAR GOLD FIELDS



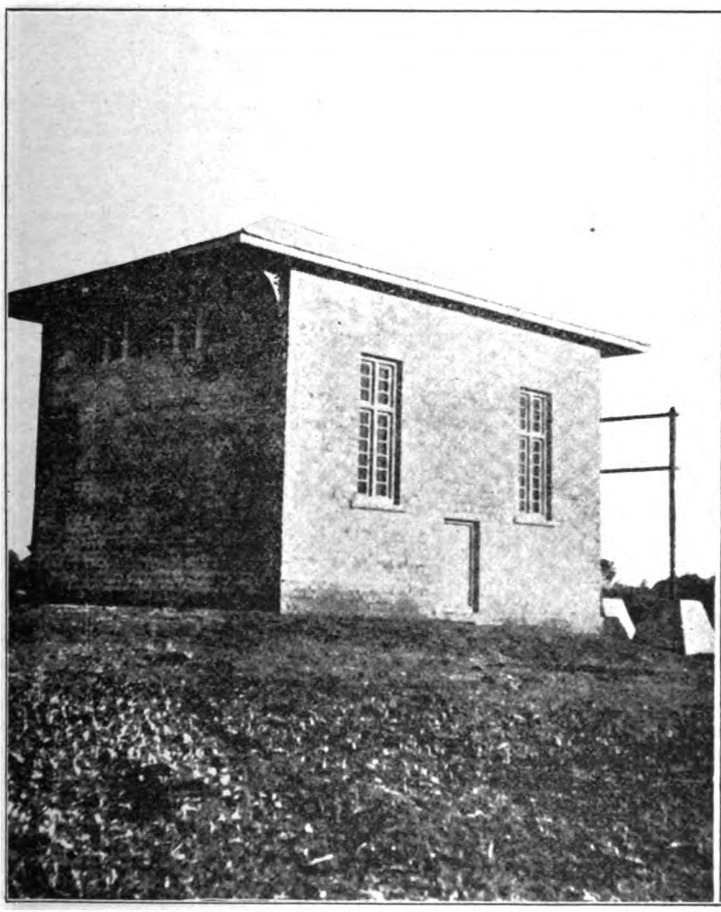


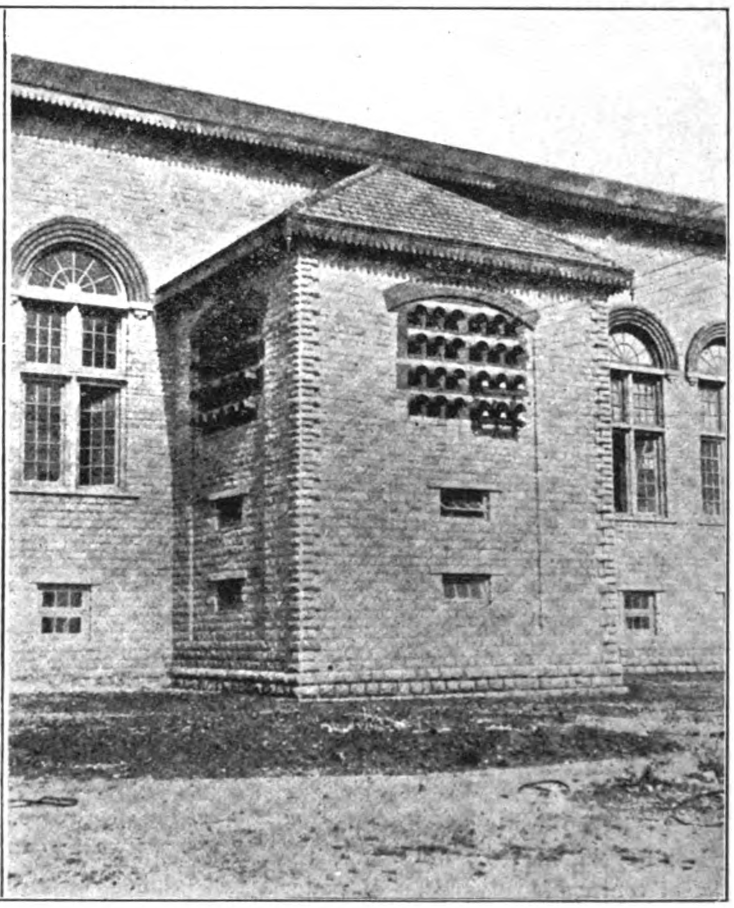
TRANSMISSION LINES NEAR SIVASAMUDRAM; IRON STRUCTURE IN FOREGROUND SUPPORTS BANGALORE TRANSMISSION LINE ON LOCKE INSULATORS. VIEW OF POLE TOPS AND INSULATORS; BANGALORE TRANSMISSION LINE, WITH LOCKE INSULATORS, ON THE RIGHT; KOLAR TRANSMISSION ON THE LEFT

supporting the two lower wires are bolted to this angle-iron. The top insulator is bolted securely to a small angle iron, which in turn is bolted inside of the top of the iron pole.

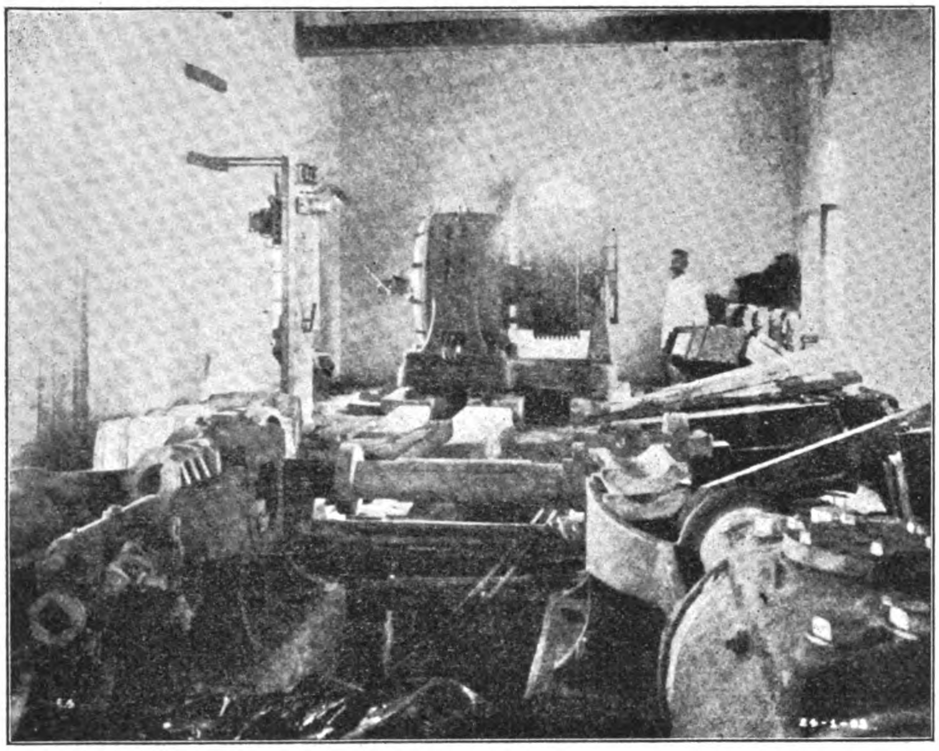
SECTION HOUSES—Two section houses are located at such points on the Kolar lines as to divide them into three approximately equal sections. Each section house contains the necessary switching apparatus for either isolating or paralleling the sections of transmission line under its control. This is a most advantageous arrangement as only ⅓ of one line need be out of service at any one time for repairs, leaving 5⁄6 of the original copper in service. One section is located at Kankanhalli and the other at Sarjapur. An attendant is always stationed in each section house in case he may be needed at any time for *cutting out* a section of line.

Another desirable feature is the increased protection of the transmission lines through the installation of lightning arresters in the two section houses. All of the arresters are of the high resistance carbon air-gap type manufactured by the General Electric Company, Schenectady, N. Y., U. S. A. Observance of the effect of lightning discharges on different parts of the transmission lines reveals the fact that those sections at river crossings, although they are the lowest points, generally sustain the most damage. This would tend to prove that the proximity of moisture plays a most important part. Of the several river crossings the longest span is 580′. Silicon bronze cables are used at these points. They are spread out horizontally about 10′ apart and anchored on special reenforced pole structures.





TRANSMISSION LINE SECTION HOUSE AT KANKANHALLI. NEAR VIEW OF LOW-TENSION DISTRIBUTION TOWER, TRANSFORMER STATION, KOLAR GOLD FIEDS



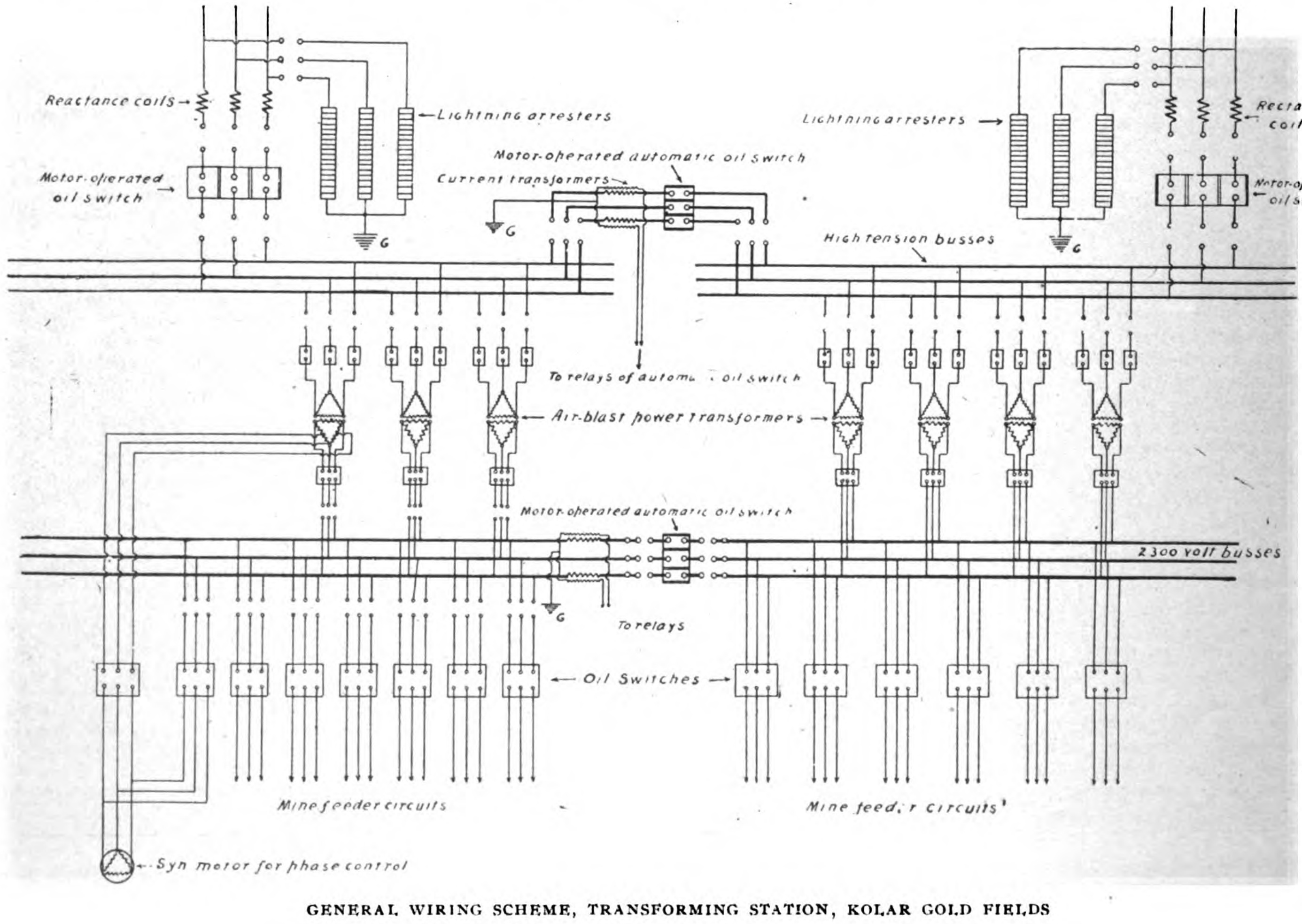
ASSEMBLY OF INDUCTION MOTOR-DRIVEN INGERSOLL-SERGEANT AIR-COMPRESSORS AT COROMANDEL MINE—KOLAR GOLD FIELDS

COUNTRY HAS VARIED TOPOGRAPHICAL FEATURES. The lines cross a country of varied topographical features, including hills, rivers, level agricultural country, and country overgrown with jungle. In the 92 ms. of line between Sivasamudram and Kolar the linewires undergo three complete transpositions. Supported on the poles of one of the duplicate transmission lines, on crossarms located 6′ below those carrying the main wires, is the telephone line establishing communication between Sivasamudram and Kolar, and intermediate points on the line. A small telephone exchange is located in the section house at Kankanhalli, at which place the line superintendent is stationed. A branch line from the latter place communicates with the head office at Bangalore. The telephone wires are transposed every fourth pole. Telephone communication is very difficult when a *ground* occurs on one of the transmission lines. The telephone wires then get an induced charge and the call-bells ring continuously until the source of disturbance is removed. During the dry season the line wires become heavily charged with atmospheric electricity and this also affects the telephone lines to some extent. On the whole, however, telephone communication is very satisfactory.

NATIVES TROUBLESOME.—Much trouble and annoyance has been caused by natives cutting the telephone wires and making use of the copper obtained thereby for making jewelry and fancy articles. In order to correct this difficulty, after having used all other means at disposal and failed thereby, it was found effective to charge the line during the night with a pressure of 1,000 volts. In case it is desired to reestablish communication during the night, a lamp and fuse is the signaling device.

KOLAR DISTRIBUTION.—The step-down transformer station at the Kolar Gold Fields is, of course, the electrical center of distribution of power to the various mines. Here the current is received at a pressure of approximately 30,500 volts and is stepped to 2,300 volts for distribution. About 3,650 h. p. is used for driving air-compressors, 2,900 h. p. for the operation of stamping mills, while approximately 500 h. p. operates small hoists, pumps, and stone-crushers. Motors rating from 100 h. p. up to 400 h. p. are wound for 2,080 volts and the smaller ones for 220 volts.

During the first installation some 30 motors and 11 Ingersoll-Sergeant Drill Company's air-compressors were installed by the General Electric Company. All of the air-compressors, with the exception of three, are driven by induction motors; two Ingersoll-Sergeant and one Walker compressor being driven by synchronous motors. All of them use rope drive. All of the synchronous motors and several of the large induction motors use starting



GENERAL WIRING SCHEME, TRANSFORMING STATION, KOLAR GOLD FIELDS

compensators. Resistance starting for induction motors is, however, much preferred where the starting of such motors is of frequent occurrence, as must necessarily be the case in mining installations.

GOLD MINES AND ELECTRIC POWER CONSUMED BY EACH.—Below is given a list of the several gold mines with the approximate of electric power consumed by each:—

Mine	H. P.
Mysore	1,750
Champion Reef	1,950
Oorgaum	1,175
Nundydroog	500
Oriental	150
Balaghat	450
Tank Block	350
Coromandel	150
Gold Field	150
Nine Reefs	150

Though this is the motor rating, the actual rating, or h. p. consumed, will fall somewhat below these values. Though the general arrangement in the Kolar transformer station is much the same in most respects as that at Sivasamudram, there are one or two additional features worthy of consideration. One of these is the installation of a 1,000-h. p. synchronous motor which is used solely for phase control or power-factor regulation of the system. With proper control of the field excitation of this motor, assisted by the field excitation of the three synchronous motors used for power purposes, it is possible to operate with normal load near unity power-factor.

PHASE CONTROL OF LONG TRANSMISSION LINES.—Phase control of long transmission lines is now considered almost as important as voltage control. Low power-factor means greater line loss, over-excitation of generator fields, heavy overload armature current for full kw. output of generator, and, in fact, low efficiency of the entire system. Strengthening the field excitation of the synchronous motor decreases the line current and consequently the armature and field currents of the generators. The synchronous motor, instead of the generator, supplies the lagging or so-called *wattless* component of the current. In addition to controlling the power-factor, the synchronous motor may also be used for voltage control within limits. As a power-factor is raised in value, the inductive loss on the line decreases, the voltage drop is lessened, and the receiver voltage is correspondingly increased.

Though the electric power consumed by the mines has almost doubled and the voltage of transmission raised only 5,000, the line loss for normal load has only increased from 12 per cent to approximately 16 per cent, due to the high power-factor obtainable. A critical examination of line characteristic curves has demonstrated the importance of phase control of transmission lines. The curves were taken with constant voltage and almost constant load at the receiving station. The decreasing difference between the values of power-factor at the transmitting and at the receiving ends of the line, as current and voltage were brought more nearly into phase, was very marked.

Another noticeable feature was the decrease of generator field current with increase of synchronous motor field excitation. This was due, of course, to the fact that the synchronous motor absorbed to so-called *wattless* current in the generator armature, which otherwise opposed the generator field magnetization, thus calling for an increase of exciting current to offset the demagnetizing armature current.

Provision has been made for starting the 1,000-h. p. synchronous motor by means of ½-voltage taps on the secondaries of two transformers of one bank of power transformers. Thus we have practically a 2-transformer, 3-wire arrangement for securing ½-voltage (1,150 volts) for starting, while the secondary of the third power transformer acts as a balancing coil.

BUS-SECTION OIL-SWITCHES, AND LOW-TENSION SWITCHBOARDS.—The high and low-tension bus-section oil-switches are opened by automatic relays with a 2,000-kw. unbalancing of load on either side of the station. These switches are motor-operated from a storage battery of 54 cells. The battery is charged from the 1,000-h. p. synchronous motor exciter unit connected on the same shaft.

The low tension switchboards on the main floor consist of eight transformer bank panels, 16 feeder panels, three total output meter panels, one line and bus-section switch control panel, three local lightning and blower-motor panels, and one synchronous motor panel. In addition to the volt, watt and current meters on the synchronous motor panel is a motor-factor meter. With rheostatic control of the field excitation of the motor, the switchboard attendant has direct control of the power-factor of the system as well as voltage regulation at the receiving station within limits.

(To be concluded in THE REVIEW *for May)*

WORLD'S GREATEST BORE

According to *The London and China Express*, Admiral Usborne Moore, R. N., of Alverstoke, delivered an exceedingly interesting lecture recently at Southsea, upon *Tidal Phenomena.* Admiral Moore was entrusted by the Admiralty with the first scientific survey ever made of the great Yangtsze bore. The admiral said that four essentials are required to make a bore, *(1)* a fast-flowing river, *(2)* a sandbar at the mouth, *(3)* a funnel-shaped estuary, and *(4)* a tidal wave coming into the estuary "bows on." All these his expedition had to perfection in the Tsieng tang Kiang, the great tributary of the mighty Yangtsze. Twice daily the tidal wave rushes in from the Pacific Ocean and, cooped up in the sand-banked estuary, the waters periodically rise to a height of nearly 20′ in places before they can overcome the pressure of the fast flowing river. The lecturer gave a graphic description of how the tidal wave from one channel cuts right through the stream from another channel, and throws itself bodily on the great seawall the Chinese built, and then he related his experience in "lying to" all night and meeting the minor part of the bore—no boat could live in the full bore, of course. Two of his companion vessels were carried away and found themselves next morning many miles up stream.

TONG-KING-YUNNAN RAILWAY

The rapid progress recently made by the French railway in Tong-King and the question of its continuation into Yunnan deserve notice. The great difficulty in the planning of the line was to discover the least costly and best alignment above Hokow, and this was accomplished after a careful survey of alternative routes during the year 1903. The French Government sanctioned the scheme in 1904, and work was begun in due course. There is no denying the fact that since the establishment of the *entente cordiale* the French have proceeded with their task in a spirit of increased confidence, and already they are looking forward to its early completion. The section of the line that is now in hand connects Hokow by the Nanhoi Valley and the City of Yunnanfu is easily accessible. The total length of the section is 288 ms.; the line from Hokow to the Songkoi Delta has been working for several years. The great difficulty of the Chinese half of the line arises from the tunnelling work, and this may be judged from the fact that nearly 100 tunnels will have to be pierced. The longest of these is 650 yds. in length. A large number of bridges, viaducts, and cuttings have also to be made, so that when the railway is completed it will be altogether a remarkable engineering feat. It is hoped that the line will be open for traffic as far as Mengtszu in the early part of next year, and that the whole will be completed 12 mos. later. The undertaking not merely reflects the highest credit on the skill and patience of the French engineers, but also promises to prove very successful as a commercial undertaking because much of the trade of Yunnan will flow down to the Gulf of Tong-king.

While this railroad is advancing towards completion a more modest scheme is likely to be commenced on the Burmese side of the Yunnan frontier. This is the light railway intended to connect Bhamo and Tengyueh in Yunnan. Survey parties are already engaged along the route, and it is hoped that their labors will be completed in about 2 mos. from the present time.

AMERICAN SHIPPING BILL

The revised bill proposed by the merchant marine commission has been presented to both houses of congress. Under the provisions of the present bill, the entire amount of the subsidies to be paid to American ships during the first year after the passage of the bill will be less than the amount to be realized from the new tonnage taxes which are to be imposed upon foreign vessels. In the second year about $1,700,000 will be required from the treasury in addition to the tonnage taxes. Thereafter it is expected the increase in bounty will amount to about $300,000 annually.

The total payments to American ships under the proposed bill will be but a fraction of the amount which is paid by Great Britain, France, or Germany in subsidies to merchant vessels. It will be some years before the annual payments will be equal to those now made by such countries as Japan and Italy to aid in establishing and maintaining an ocean merchant marine.

Every country having a coast line, save the United States alone, has evidenced a high sense of the value of an ocean marine by paying subsidies to keep its ships afloat in foreign trade. The highly patriotic and intelligent Japanese, who have just had an object lesson of the great value of a merchant marine, to a country engaged in war, are coming to the aid of their government, which has other heavy burdens to carry, and are raising by private subscription the sum of 15,000,000 yen, to be devoted to the building of high-class merchant steamships of a type readily to be converted into auxiliary cruisers in time of war. This money is to be expended without hope of pecuniary profit, but merely to aid the government in its purpose of creating a large merchant marine, through which to expand Japan's trade and to be an auxiliary naval force in time of war.

With the many lessons before it, Congress should not delay the passage of the present bill, which represents the conclusion reached as to the least expensive method of aiding in the rehabilitation of American deep-water shipping which yet could hope to accomplish any results. President Roosevelt, in his message to Congress. has given his approval to the measure presented by the Commission and has called the attention of Congress to the necessity of taking action on it. The merits of the bill are self-evident; and there is no excuse, says the *Seattle Post-Intelligencer*, for neglecting to take action on this important matter at the present session.

Great Activity in Schoolbuilding Construction Throughout the Philippines

Schoolhouse construction is being carried forward with great activity throughout the Philippine Islands at the present time, and hundreds of thousands of pesos are being expended in this direction. As schoolhouses are one of the best indications in the general public interest in education, there seems to be little more left to be said about the eagerness of the Filipinos to secure in this line what the American government is offering them.

From the standpoint of construction this big building campaign is furnishing new architectural ideas which are interesting to follow. While all of the plans show a more or less close regard for the prevailing Spanish-Filipino style of construction, on both exteriors and interiors, the architect to the Bureau of Education, Mr. Chard, has never failed to introduce American ideas and American arrangements to bring the buildings as nearly as possible up to the standard of the modern school building in the homeland, keeping in mind all the time, however, that the demands of the tropics are always a first consideration. Reinforced concrete and native hard woods are the principal materials being used in construction.

At the request of THE FAR EASTERN REVIEW, Mr. Gilbert W. Brink, assistant director of education, has furnished some interesting data relative to schoolhouses being built in the various provinces at the present time, or whose construction will begin in the very near future. This data follows:—

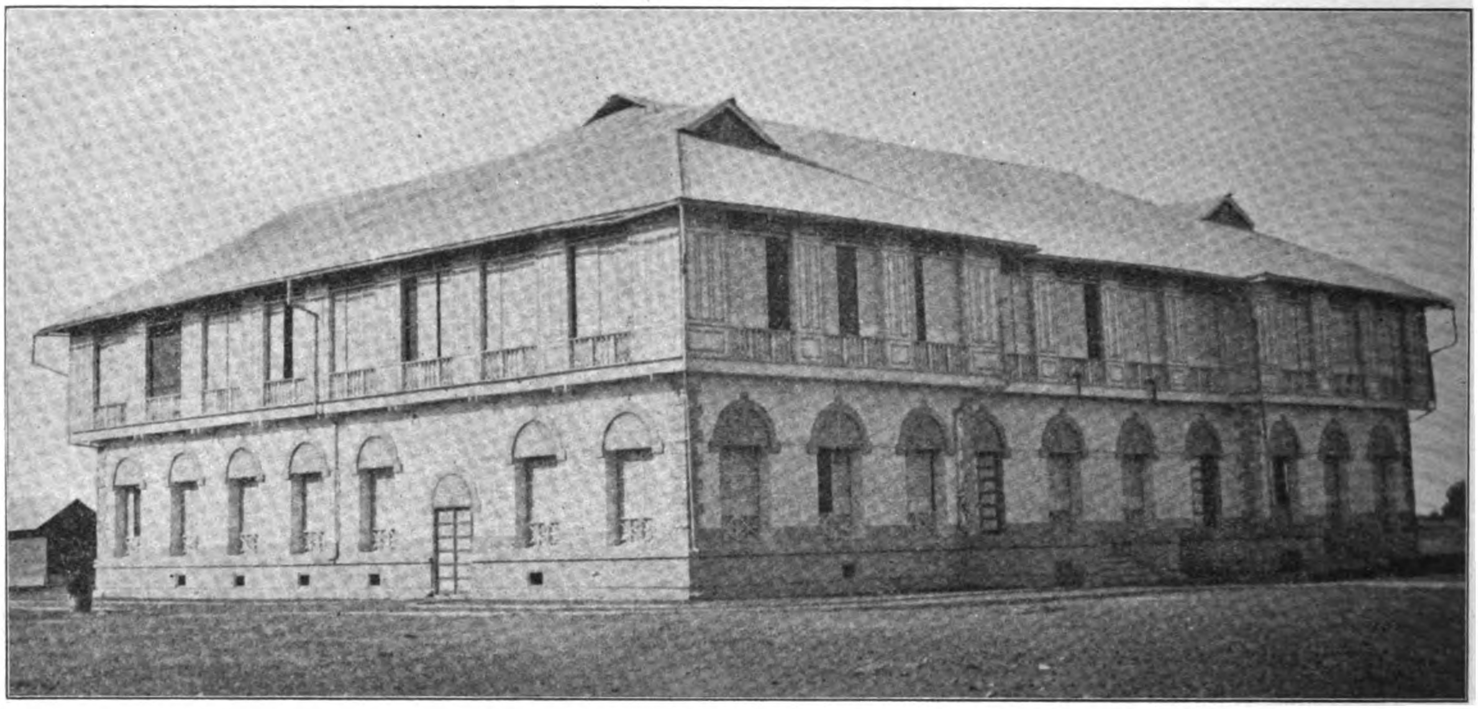
Ilocos Sur.—₱12,000 for a shop building in which will be taught iron-working, wood-working, wheelwrighting, blacksmithing, and mechanical drawing. This building is to be constructed upon the foundations of the large public building completed in Spanish times, but destroyed in the insurrection. Its value when completed will approximate ₱20,000.

Albay.—A high school has just been completed at a cost of from ₱30,000 to ₱40,000. In addition to this, ₱8,000 from insular funds are set aside for the construction of a shop building which will be begun in the very near future. The work in this shop building will be primarily wood-working, including carpentry, cabinet making, and wheelwrighting.

Ambos Camarines — ₱8,000 from insular funds are allotted to this province for the construction of a shop building in which will be taught wood-working, and in connection with which will be carried on courses in agriculture.

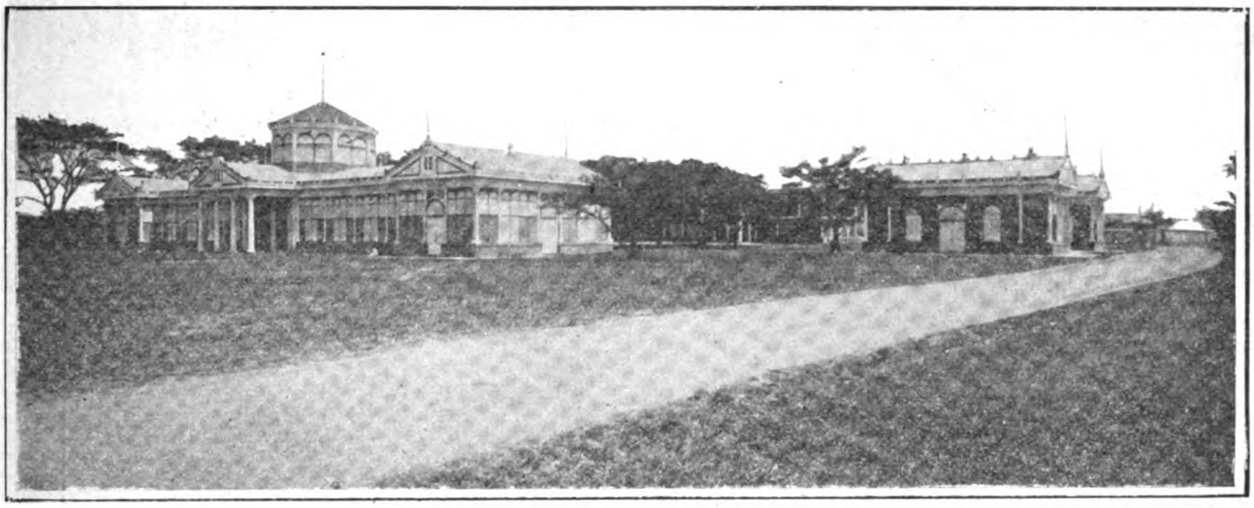
Antique—₱6,000 have been set aside from insular funds for the remodelling and repair of the large municipal school building purchased by the province for a provincial school.

Bataan.—Bataan has secured ₱6,000 from insular funds and is raising ₱5,000 locally by popular subscription which will give a total fund of ₱11,000 for the construction of a building for the provincial school.



NEW PROVINCIAL HIGH SCHOOL AT BATANGAS, PROVINCE OF BATANGAS, ISLAND OF LUZON, IN WHICH COMBINATION OF AMERICAN ARCHITECTURAL IDEAS WITH SPANISH-FILIPINO TYPE IS VERY PRONOUNCED

FRONT ELEVATION OF PROVINCIAL HIGH SCHOOL AT SORSOGON, PROVINCE OF SORSOGON, ISLAND OF LUZON, WHICH IS NEARING COMPLETION AT A COST OF ₱100,000. IT IS CLAIMED THAT THIS WILL BE THE FINEST SCHOOLBUILDING IN THE ISLANDS



VIEW OF PHILIPPINE NORMAL SCHOOL WITH SCIENCE BUILDING IN FOREGROUND, MANILA, WHICH GIVES A FAIRLY GOOD IDEA OF SPANISH-FILIPINO ARCHITECTURE

Batangas.—Batangas has recently constructed an excellent provincial school building from funds secured by the sale of government rice, and now has ₱5,000 allotted from insular funds for the purchase of an intermediate school plant at Lipa in connection with which will be conducted experiments in agriculture with special attention to coffee culture.

Benguet.—Benguet has secured ₱6,000 for the construction of an industrial school for the Igorot children, special attention in this school being given to the wood-working and the making of agricultural tools.

Bohol.—Bohol has secured ₱10,000 from insular funds and has appropriated an additional ₱10,000 from provincial funds for the construction of a provincial high school building, and has also appropriated ₱6,000 for the construction of an industrial school. In addition to this the people of Tagbilaran, the capital of the province, have subscribed ₱1,000 for the purchase of a wind mill pumping plant with which to raise water for house purposes and for the irrigation of school gardens. Considerable work in agriculture will be done here.

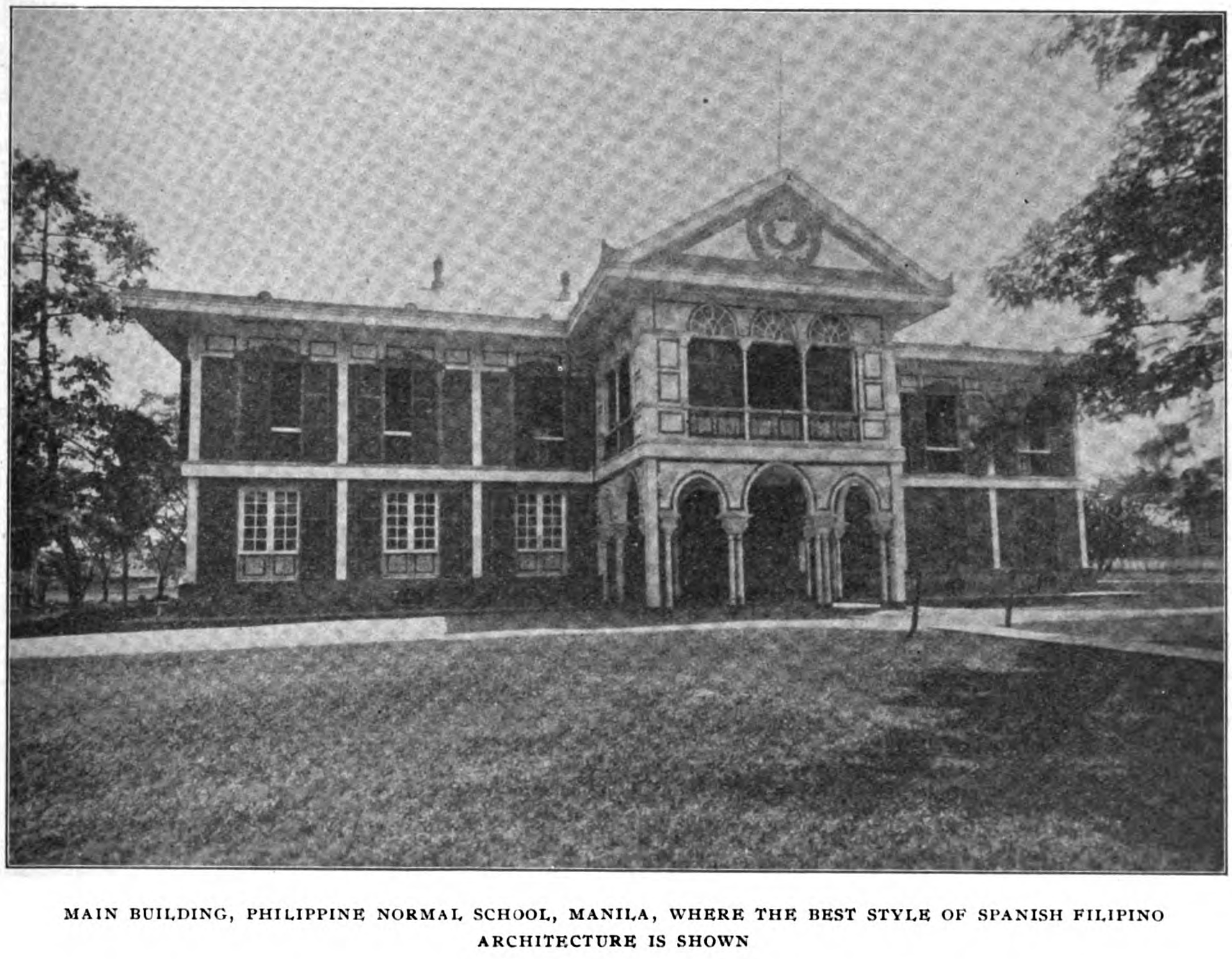
Bulacan.—Bulacan received ₱10,000 from insular funds and voted in addition ₱22,000 from provincial funds for the construction of a provincial high school building, which is already completed and is one of the best appointed school buildings in the archipelago.

Cagayan.—Cagayan receives ₱8,000 from insular funds, appropriates ₱2,000 from provincial funds for the construction of an industrial school building. In this building will be conducted classes in iron-working, wood-working, wheelwrighting and mechanical drawing. Special attention will also be given agriculture. The province has recently purchased a site with buildings on it for the provincial high school.

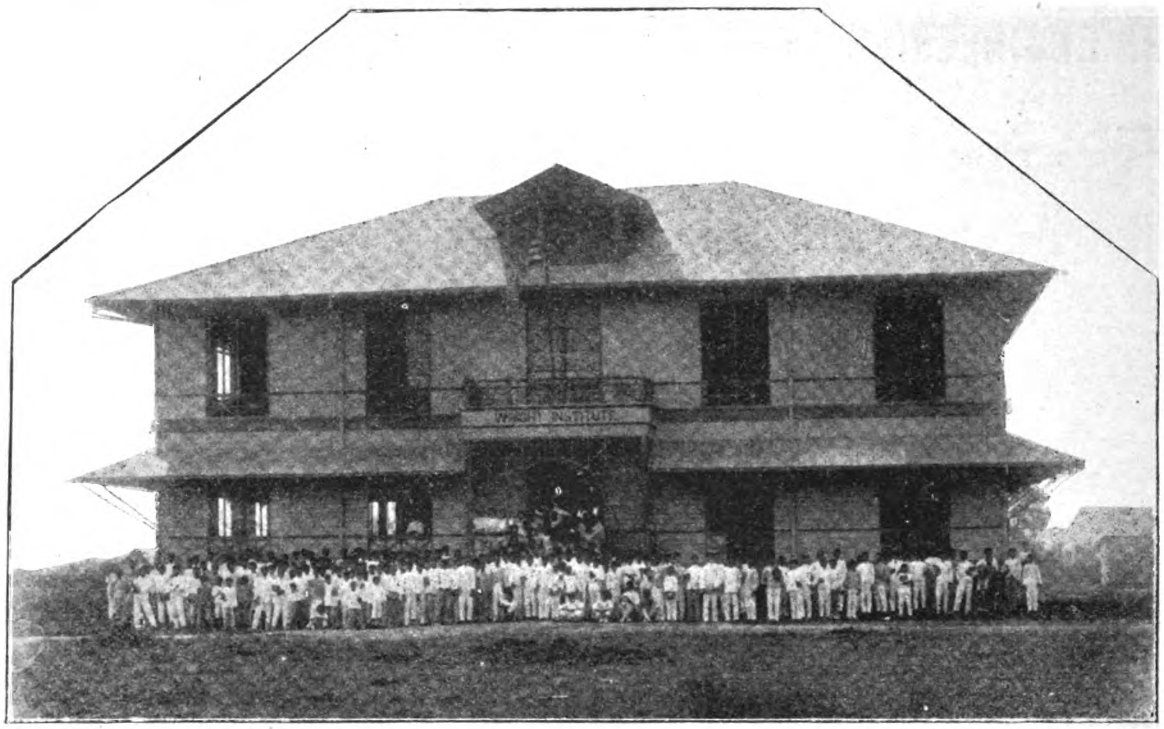
Capiz.—Capiz receives ₱8,000 from insular funds for the construction of a shop building, the people donating an ample site in Capiz, and additional funds being provided by the province and the people.

Cavite.—Cavite received ₱8,828 for the construction of an intermediate school at Indang. To this was added ₱1,000 appropriated by the province. This building is complete and now ready for occupancy. ₱12,000 has been set aside for the construction of shop buildings in Cebu upon condition that adequate sites are provided and some additional money locally.

Ilocos Norte.—Ilocos Norte received a large amouut of the government rice and from it constructed a very large and well appointed



MAIN BUILDING, PHILIPPINE NORMAL SCHOOL, MANILA, WHERE THE BEST STYLE OF SPANISH FILIPINO ARCHITECTURE IS SHOWN



NEW PROVINCIAL HIGH SCHOOL AT SAN ISIDRO, PROVINCE OF NUEVA ECIJA, NORTHERN LUZON, IN WHICH AMERICAN STYLE OF ARCHITECTURE IS DECIDEDLY PRONOUNCED

high school building during the past year. Its value is probably close onto ₱40,000.

Iloilo.—Iloilo receives ₱32,000 insular funds, ₱10,000 provincial funds and ₱15,000 municipal funds with which to construct provincial high school, provincial shop buildings, in which will be conducted classes in woodworking, iron working, drawing, wheelwrighting, blacksmithing, etc. A site of 10 hectares was purchased of the province for this school, and another site of 1 hectare was purchased by the municipality for the intermediate school—the intermediate school being also constructed out of these funds.

Isabela.—Isabela receives ₱10,000 insular funds, and secures approximately ₱4,000 additional for the construction of an intermediate school at Ilagan.

Laguna.—Laguna receives ₱10,000 for the construction of a high school, appropriates ₱10,000 from provincial funds and has a site donated for the location of the high school. Still further appropriation by the province is expected for this purpose.

Union—Union province received ₱12,000 from insular funds for the construction of a high school, and provides a certain amount of voluntary work and materials contributed for the completion of this building.

Leyte.—Leyte receives ₱10,000 from insular funds, appropriates ₱10,000 from provincial funds and has secured several thousand pesos on private contributions within the province for the construction of the high school at Tacloban.

Manila.—Manila received ₱6473.85 for repairs and extensions on the insular normal and trade schools located here.

Masbate.—Masbate secures ₱8,000 for the construction of a central school at that place, the site to be provided locally.

Mindoro.—Mindoro receives ₱5,000 insular funds for the construction of a shop building, which is already completed.

Misamis.—Misamis is to receive ₱8,000 for the construction of a small high school building. Local donations will be added to increase the available amount.

Occidental Negros.—This province received ₱8,000 from insular funds and ₱20,000 by a loan. Three thousand and some odd pesos in addition were provided locally.

Oriental Negros.—This province received ₱6,000 from insular funds and ₱20,000 by loan, with which to construct a high school building at Dumaguete.

Nueva Ecija.—Nueva Ecija received ₱8,000 from insular funds for the construction of an intermediate school building at Cuyapo.

Pampanga.—Pampanga will receive ₱12,000, part of which will be employed in the remodelling and repairing of an industrial school building at Bacolor and the remainder in the construction of a high school building at San Fernando.

Pangasinan.—Pangasinan receives ₱8,000 for the construction of an intermediate school at Binalonan. To this amount is added ₱10,000 provided by the town.

Palawan.—Palawan received ₱4,000 for the construction of a shop building at Cuyo.

Rizal.—Rizal received ₱9,252.75 from insular funds which was expended in part upon a shop building at Pasig, an intermediate school building at Marong and an intermediate school building at Malabon.

Romblon.—Romblon receives ₱8,000 insular funds, to which will be added several thousand pesos provincial funds.

Samar.—Samar is to receive ₱8,000 for the construction of shop buildings.

Sorsogon—Sorsogon is to receive ₱12,000 which are to be added to some ₱50,000 provided by the province for the construction of a high school building. This building will probably be the handsomest building constructed in the islands in the near future.

Surigao.—Surigao received ₱16,000 from insular funds in addition to ₱16,000 provided locally by popular subscription for the construction of high school and shops.

Tarlac.—Tarlac receives ₱7,000 for the construction of shop buildings at Tarlac in which the usual courses will be given.

Tayabas.—Tayabas received ₱12,775 from insular funds which were added to ₱14,000 provincial funds, for the construction of a high school building at Lucena.

Zambales.—Zambales receives ₱8,000 insular funds, and provides about ₱6,000 from provincial funds and by private subscription for the construction of the high school at Iba.

Nueva Vizcaya.—This province receives ₱6,000 from insular funds for the construction of a small provincial school building at Bayombong.

MANILA ELECTRIC R. R. & L. CO.

On April 10th the Manila Electric Railroad and Light Company celebrated the first anniversary of the opening of its tramway, light and power system to the public. The first year's business was phenomenal. During that period the company carried over its transportation lines more than 10,000,000 fares, and during March last, alone, 872,000 passengers were handled. Some months during the year the number of passengers was greater and some months less, but the number is a fair average of the passenger business done per month. The earnings on this 10,000,000 fares exceeded ₱1,000,000, of which the City of Manila received 2½ per cent. The company has a total of 1,134 employés on its weekly payroll. Of this number 978 are employed in the railway department and 156 in the lighting and teaming department. There are at present 85 cars running, and 10 new cars are being set up, with 10 additional cars on the way. Of the 10 cars being set up four of them are the new large cars ordered for the Malabon line, each having a seating capacity of 60 persons.

FOR RENT:—New apartments containing living room, dining room, kitchen, two bed rooms, bath, water closet, and large veranda. Modern plumbing; electric lights. Best situation in the city. Cool and comfortable. From ₱50 to ₱70 per month.

PIERCE & WHITTON,

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FAR EASTERN ENGINEERING, CONSTRUCTION, COMMERCIAL AND FINANCIAL NEWS

PERSONAL

DR. KANAME HARAGUCHI, an eminent Japanese, has been engaged as a railway engineer by the Chinese Government, at a salary of -Y-12,000 a year.

MR. W. E. SHELLIM has resigned from the Board of Directors of the Hongkong and Shanghai Banking Corporation, being succeeded by Mr. D. M. Nissim.

HON. F. COOPER, formerly of Hongkong, now director of public works at Ceylon, has been elected first president of an engineering association recently formed at Colombo.

MR. R. PEIRCE has resigned the post of Municipal Engineer of Singapore, the resignation to take effect within 6 mos. Mr. Peirce has been in the service of Singapore for many years and retires on account of the inadequate salary his office pays.

Mr. J. W. BEARDSLEY, consulting engineer to the Philippine Commission, has sailed for the United States. He expects to be absent from his post several months, during which time Mr. Kendall, his chief deputy, will have charge of the office.

MR. H. D. C. JONES, manager of the Manila branch of the Hongkong and Shanghai Banking Corporation, has left his post here and sailed for England on a well-earned vacation. During his absence Mr. A. G. Stephen will act as manager of the Manila bank.

MR. M. SERGEY FRIEDE, of New York City, has been appointed general foreign agent of the Chinese Eastern Railway Company, in the commercial freight and passenger departments. He is now in Shanghai, where he will maintain offices of the general foreign agency.

MR. C. G. WARNFORD LOCK, M. Inst., M. M., F. G. S., has just returned to Singapore from a 3 mos. tour of inspection and exploration in Kemaman, one of the little-known independent native states of the Malay Peninsula, and has since been engaged in reporting on extensive tin mines in the neighborhood of Raub. Mr. Lock, until about 1 yr. ago, was general manager of the mines of the Australian Raub Gold Mining Company, Ltd., at Raub, where he was successful in reducing working costs to an exceptionally low figure. He is a well-known and experienced mining authority. Messrs. Charleton, Dickinson & Co., mining consulting engineers, of 353 Mansion House Chambers, London, announce that they have made arrangements with Mr. Lock that he should act as their representative in the Far East. Mr. Lock has opened an office in Singapore and Messrs. Charleton, Dickinson & Co. have arranged to represent him in London.

MR. W. G. WINTERBURN, M. I. N. A., has resigned the office of general manager of the well-known shipbuilding and engineering firm of Messrs. George Fenwick & Co., Ltd., of Hongkong, and will return to his home in England next month. At the recent seventeenth ordinary general meeting of the shareholders of this concern, Mr. A. Rodger, chairman of the board of directors, made the following merited allusion to Mr. Winterburn's retirement:—"Mr. Winterburn, our present general manager, who is leaving the colony in May, has resigned his position after 14 yrs.' service, throughout which time he has worked hard and done his best to promote the welfare of the company. We all wish him, I am sure, every success in his new undertaking." Mr. J. I. Andrew, who has been in the company's service for nearly 10 yrs. and understands the routine of the business, having carried on Mr. Winterburn's duties during his absence on leave for 10 mos. in 1901, has been appointed to succeed him.

RAILWAYS, SUPPLIES, ETC.

PEKING-KALGAN RAILWAY.—The first section of this line, from Fengtai to Nankao, has been opened to traffic.

URGA-KALGAN RAILWAY.—It is proposed to construct a railway from Urga to Kalgan, which will prove an important factor in the development of Mongolia.

LIGHT KOREAN RAILWAY.—The light railway between Ham-hyung, Korea, and the sea coast, has, it is reported, been nearly completed by the Japanese authorities.

HSINMINTUN RAILWAY.—The Japanese have completed the first section of the Hsinmintun-Fengtien Railway, and an agreement has been concluded to hand over the line to the Chinese.

KASHGAR (CHINA) RAILWAY.—The Governor of Shinking has been directed to raise funds for the building of the Kashgar Railway, which is urgently needed to facilitate trade and must be constructed at once.

ANHUI (CHINA) RAILWAYS.—The director of the Anhui Railways has notified the government that Kwang-te-chow is an important commercial center and he proposed first to construct a railway from Wuhu to that place.

RAILWAY IN TIBET.—The Chinese Government has approved a proposal for the construction of a railroad from Chengtu to Lhassa and it is expected that the work of construction will begin as soon as the Tibetan Treaty is signed.

LOCOMOTIVES FOR SIAM.—The Royal Railway Department of Siam has requested tenders for the supply of nine passenger and seven freight locomotives with spare parts. Drawings and conditions may be obtained against payment of Tcs. 5 at the central office of the department at Bangkok.

CANTON-HANKOW RAILWAY.—According to the *Times of Malaya*, the Cantonese community of the Straits Settlements and the Federated Malay States have large financial interests in the Canton-Hankow Railway. In Ipoh, Perak, F. M. S., the Cantonese have taken up over $200,000 worth of stock.

RAILWAY CONSTRUCTION IN BURMA.—Railway construction is proceeding with much activity in Burma just now, and one of the most important works of this kind in hand is the Pegu-Martaban line, whose terminus will be on the bank of the Salween River opposite to the N. end of Moulmein. There is also talk of a railway from this latter place S. to Yeh.

SZECHUAN-HANKOW RAILWAY, CHINA.—This line is to be divided into four sections, three in Szechuan and one in Hupei, *viz.*: Section 1, from Chengtu to Chungking; Section 2, from Chungking to Wanhsien; Section 3, from Wanhsien to I-chang; Section 4, from I-chang to Hankow. The entire length of the line will be 3,600 *li*, only a trifle shorter than the Peking-Hankau Railway.

KOREAN RAILWAYS.—The Japanese Diet has under consideration a bill for the purchase of the Seoul-Fusan Railway and the amalgamation of all the railways in Korea. The cost of purchasing the Seoul-Fusan line is estimated at about -Y-30,000,000, including -Y-15,000,000 capital of the company; and -Y-10,000,000 advanced by the government from special funds.

PENANG HILL RAILWAY, S. S.—Mr. Fryer, chief engineer of the Federated States Railways, was recently asked to report on the Penang Hill Railway, Straits Settlements, the works on which had fallen short of requirements. According to *The Pinang Gazette*, the report is highly unfavorable. It recommends changes and improvements on the line at an outlay so heavy as to stagger investors.

CANTON-KOWLOON RAILWAY.—The viceroy at Canton has asked the Peking Government to leave the construction of the Kowloon-Canton Railway in the hands of the British, owing to the repeated representations which have been made by the British and in view of the approaching commencement of the works at Kowloon. The work of construction may commence at both ends of the line simultaneously.

KIUKIANG-NANCHANG RAILWAY.—It was originally intended that the first Kiangsi Railway should run from Tsai Chai-hu to Kiukiang, but the engineer who is locating the line considers that the route from Tsai Chai-hu is not favorable, so had to change it to begin from Sai-ko. The engineer is now busy at Kiukiang drawing up plans for the proposed new route to be submitted to proper authority for approval.

WATER SUPPLY, BANGKOK.—It has been decided to unite the water supply scheme for Bangkok with the great irrigation scheme which is in progress by the Siamese Government. The new waterworks will, in all probability, be established at Samsen, with all the necessary equipment of reservoirs, filter beds, etc., and the water will be distributed by means of mains throughout the city. The work is expected to occupy about 3 yrs.

SUNNING RAILWAY, SOUTH CHINA.—The promoter and director of the Sunning Railway, South China, for which the full capital has been subscribed by Chinese in America, expects soon to have the line under construction. With this line in operation it is intended to construct a line from Tan Sui Kow to Kongmun, and later on from the latter place to Heungshan. The preliminary survey of these prospective lines is now being arranged for.

PHILIPPINE RAILWAY COMPANY INCORPORATED.—The Philippine Railway Company has filed articles of incorporation with the secretary of state at Hartford Conn., U. S. A. The authorized capital stock is $5,000,000 gold, and the incorporators, all of whom reside in Hartford, are Arthur L. Shipman, Charles Gross, and Alvan W. Hyde. The Company proposes to operate steam and electric railways in the Philippine Islands and elsewhere, and to do a general transportation business.

NINGPO-HANGCHOW RAILWAY.—It is reported from Hangchow that the British minister has refused to cancel the Ningpo-Hangchow Railway Concession, according to *The Universal Gazette*, and that the matter is being discussed between the minister and the Wai Wu Pu. Seng Kung-pao has written to Messrs. Jardine, Matheson & Co., the concessionaries of this line, that the agreement has become void. In reply Messrs. Jardine, Matheson & Co. said that the matter was now in the hands of the British minister at Peking, and that they refused to regard the agreement as cancelled.

STRAITS TO BURMA BY RAIL.—The Province of Tenasserim, Lower Burma, is receiving attention in the matter of railways, and indications are that in the near future Moulmein will become an important railway center. Besides the connection with Pegu, which is rapidly approaching completion, several other schemes are in the air. One is the reconnaissance survey now being conducted towards the Siamese frontier for a line to connect with the Siamese railway system. Another is the survey of a line to Yez, the construction of which will be the first step towards connection with the line in the Straits Settlements.

RAILWAYS IN BORNEO.—It has been decided to construct a line of railway across British North Borneo, the road to form a connection between the E. and W. coasts, and, when completed, will give a total length of 250 ms. The extension will commence at Tenom, 90 ms. from Jesselton, the principal coast terminus on the China Sea, and, traversing some of the most valuable timber lands of British North Borneo, will terminate at Cowie Harbor, on the E. coast. The extension is estimated to cost £1,500,000 and will be constructed in sections. It is intended to grant to the company which will be formed to carry out the scheme alternate blocks of land, each 40 sq. ms. in extent, which can be utilized for rubber, tobacco, etc. It is hoped that the work on this extension will be commenced early next year.

RAILWAY CONSTRUCTION, PHILIPPINES.—Mr. H. A. Belden, general manager of Messrs. J. G. White & Co., Inc., in the Philippine Islands, has received a letter from the home office of his company in New York City to the effect that preparations for the active work of constructing the railway lines on the islands of Cebu, Panay, and Negros, are now under way. Plans and contracts for material are all being arranged in New York. The home office is sending out a staff of expert field engineers for survey work, and Mr. Belden says that when work is well under way fully 5,000 men will be employed, at least 300 of which will be Americans. Filipino common labor will be given preference over other such labor if it is forthcoming. If not resort will be taken to Japanese labor. Most all the carpenter work will be done by Japanese.

RAILWAYS IN NORTH BORNEO.—It has been decided to construct a line of railway across British North Borneo, according to latest London advices. The line will form a continuous connection between the E. and W. coasts, and, when completed, will be of a total length of 250 ms. The extension will commence at Tenom, 90 ms. from Jesselton, the principal coastal terminus on the China Sea, and, traversing some of the most valuable timber lands of British North Borneo, will terminate at Cowie Harbor, on the E. coast. The extension is estimated to cost ₱1,500,000, and will be constructed in sections. It is intended to grant to the company which is to be formed to carry out this scheme alternate blocks of land, each 40 sq. ms. in extent, which can be utilized for rubber, tobacco, etc. A considerable portion of the line, which runs close to the Dutch boundary, will traverse country inhabited by some of the wildest tribes of these regions.

LOCOMOTIVES FOR CHINA.—For working traffic over the Shanghai-Nanking Railway, Messrs Robert Stephenson & Co., Ltd., of the Springfield Works, Darlington, are now completing 10 powerful 4-coupled bogie locomotives, to the specifications of Messrs. Sir John Wolfe Barry and Partners. These locomotives, the first lot of which have already been shipped from Middlesbrough, are built for the 4′8½″ gauge, have been constructed upon American lines, and are of very liberal dimensions, as the width over the platforms is no less than 9′. The cylinders are 18×20″ with ordinary "*D*" slide valves between the frames, operated by the simple Stephenson link motion reversed by a wheel and screw on the left hand side of the engine. The four coupled wheels have a diameter of 6′7″, and the bogie wheels a diameter of 3′6″, the fixed wheel base being 8′3,″ and the total wheel base 25′2″. The boiler barrel has a maximum outside diameter of 4′10⅝″, and a length between tube plates of 13′0″ the length of the fire-box shell being 9′ (outside). The working pressure of the boiler is 180 lb. per sq. in. The boiler is fitted with brass tubes, each 2¼″ in diameter, giving a heating surface of 1,467.39 sq. ft., whilst the fire box provides an additional 162 61 sq. ft., the total heating surface therefore being 1,630 sq ft. The grate area is 28 sq. ft., this being to allow of the use of inferior coal. The engine is fitted with the Westinghouse quick-acting brake, the pump being fixed on the right hand side of the smoke box. The 4-coupled wheels of the engine and the tender wheels only are braked. The engine and tender have an aggregate weight on rails of 98 tons 7 cwts.

ELECTRIC LIGHTING, TRACTION POWER, ETC.

SHANGHAI-MANILA CABLE.—The Shanghai-Manila submarine cable, the laying of which by the steamer *Silvertown* required about 11 days, has been completed.

WIRELESS TELEPHONE, JAPAN.—According to a telegram from Tokyo to Shanghai a naval engineer named Kimura has succeeded in inventing a wireless telephone.

BOOM IN ELECTRIC RAILWAYS IN JAPAN.—According to *The Japan Chronicle*, there is about to be a boom in electric railways in Japan to the detriment of steam-power lines.

ELECTRIC RAILWAY FOR KOBE.—The Kobé Assembly having agreed that a charter be granted to a private company, the syndicates formed for the purpose of carrying electric railways into the city will be incorporated into one body. It is expected that the company will draw its motive power from the Kobé Electric Light Company.

INJUNCTION NOT SANCTIONED, MANILA.—Recently a Manila merchant brought injunction proceedings against the City of Manila to prevent it from entering into a contract with the Manila Electric Railroad and Light Company covering the repair of streets by the municipality which are torn up for the laying of street railway rails. The court held that the city had a perfect legal right to make the contract.

MESSRS. RILEY, HARGREAVES & CO., LTD., SINGAPORE.—This well-known Singapore contracting firm has secured another order for the installation of a complete electric lighting plant in a rice mill in Saigon. The work includes the supply of high-speed engine, dynamo and arc lamps as well as all cables, lighting, fittings, and fans. This contract makes the third electric generating plant which Messrs. Riley, Hargreaves & Co. have undertaken for rice mills in Saigon quite recently.

WATERWORKS AND IRRIGATION

WATERWORKS AT WUCHANG.—Actual work in this improvement has been commenced. The construction is in charge of a German civil engineer who is receiving a salary of $1,200 per month for his services.

GRAVITY WATER SUPPLY, MANILA, P. I.—The Atlantic, Gulf and Pacific Company, of New York City and Manila, has begun the construction of the tunnel in the new gravity water supply system for the City of Manila, at station 260, about 5 ms. from El Deposito and 1/3 of the distance to the new base of water supply something like 3 ms. beyond Montalbon at the headwaters of the Mariquina River. The track between Montalbon and El Deposito, a distance of about 18 ms., is practically completed and the contractors, the Matson-Lord-Belser Company, are ready to finish the dam and reservoir so soon as materials arrive, which will be shortly.

TIENTSIN NATIVE CITY WATER SUPPLY.—The sales of water by the Tientsin (N. China) Native City Waterworks Company, Ltd., during 1905, show a great increase over 1904. The total receipts amounted to Tls. 37,110.34 against Tls. 20,639,74, an increase of 82 per cent. The total galls. delivered in 1905 was 97,284,912 against 47,063,451 in 1904. The profits on this item amount to Tls. 56,190.57 against Tls. 1,456.03 in 1904, an increase of over 100 per cent. The capacity of the plant is about 1,000,000 galls. in 24 hrs. During 1905 13,363′ of new mains were laid, bringing the total length of mains up to 96,815′, or about 16 ms. Forty-nine new private installations were made during the year, the most important being for supplying the Imperial Chinese Railway, the provincial mint of the viceroy, the *yamen* of the viceroy, and a 5″ main for the Japanese Concession. Altogether the company has now 143 private installations. In order to secure an uninterrupted connection with the districts E. of the Peiho, which districts were formerly supplied with a 12″ main only, crossing the river N. of the Austrian Bridge, a new 12″ main has been laid. This crosses the Grand Canal, passes the Lutai Canal, and connects there with the company's mains in the Austrian Concession, thus making a complete circuit of the Eastern Extension of the city.

BUILDINGS

NEW MARKET FOR SINGAPORE.—It is proposed to construct a new market at Tanjong Katong, Singapore.

TAN TOCK SENG HOSPITAL, SINGAPORE.—The tender of Messrs. Howarth, Erskine, Ltd., of Singapore, of $59,743 for the construction of foundations in connection with the new Tan Tock Seng Hospital at that place, has been accepted.

SCHOOL BUILDINGS, PHILIPPINE ISLANDS.—The government has awarded contracts for the erection of school buildings in Iloilo, Panay, and Bacolod and Dumaguete, Negros. A provincial high school and a manual training school will be constructed at Iloilo of native hard wood, the former to cost -P-28,850 and the latter -P-13,600. These contracts have been let to the Manila Saw Mills Company. An intermediate school will also be built at Iloilo to cost -P-14,459.86, the material to be of native hard wood and Oregon pine. The buildings in Negros will be constructed by the Manila Saw Mills Company, one to cost P25,850 and the other P26,359. Native hard wood will be used in both structures.

PUBLIC WORKS

PUBLIC PROPERTY IMPROVEMENTS, PAHANG, F. M. S.—For the current year $77,100 have been set aside for the improvement and repair of public property in the States of Pahang, F. M. S.

ROAD IMPROVEMENTS, PAHANG, F. M. S.—The State of Pahang, F. M. S., will spend the following sums on roads during the year: Cart road trace, Lipis to Kuantan, $20,000; metalling Batu Talam-rd, $10,000; replacing temporary bridges by permanent ones, $20,000; Bentong-Telemong-rd, $100,000; Ginting Sempak-Bentong-rd, $100,000; Blat-rd to Lepar Watersheds, $50,000.

NEW SEWER SYSTEM, MANILA, P. I.—The contractors have begun the construction of the new sewer system for the City of Manila. At the outlet on Tondo Beach, where the main pipe connects with the bay, excavations are being made preparatory to the installation of the large pumps which are to drain off the surface water and prepare that section for the extensive work laid out for the installation of the great system. There will be a sub-station at the corner of Calles Azcarraga and Arranque, and another at Plaza Santa Ana. On the opposite side of the Pasig River there will be secondary pumping stations along the main pipe at the corner of Calles Nozaleda and Bagumbayan, Calles Herran and Nueva, Malate, and at the Paco Estero.

PORT WORKS, DREDGING, DOCKS, ETC.

STEEL WHARVES, MANILA.—Bids for the materials and construction of the two steel wharves for the new harbor, Manila, have been opened. The Atlantic, Gulf and Pacific Company, of New York City and Manila, were the lowest bidders, the tenders ranging from -P-900,000 to -P-1,250,000. The other bidders were the Milliken Bros. of New York City, the Cotton Bros. and Healey, Tibbets & Co., of San Francisco, (bids mailed in), and Salvador Farre, now constructing the Santa Monica sewer. The work contracted for must be completed within 20 mos, and when they are finished the wharves will have a deck surface of 12,500 sq. yds.

WHANGPU CONSERVANCY.—According to *the Universal Gazette*, Mr. J. de Rijke has written to the Chinese authorities, from Shanghai, to the effect that he will accept the engineering duties of the conservancy of the Whangpu under the following conditions:—(1) He will be engineer-in-chief of the work; (2) he will receive a salary of £3,000 per year; (3) the offices and his residence with six rooms provided with furniture complete shall be supplied by the Chinese Government; (4) if any engineers be employed, either at the recommendation of himself or other parties, such engineer shall be examined by the engineer-in-chief before employment; (5) the term of the agreement shall be 5 yrs. from the date of the arrival of the engineer-in-chief in Shanghai.

BRIDGES

AYALA BRIDGE, MANILA.—The Atlantic, Gulf and Pacific Company is making rapid headway on the reconstruction of the approaches to the Ayala Bridge. It is expected that when completed they will be highly ornamented highways.

NEW CANAL BRIDGE, MANILA.—A new bridge will be erected in Calle Moriones, Manila, in the near future. The present structure across the canal at this point is in a dangerous condition. The city engineer has been instructed to include the funds for the construction of the bridge in his next estimate for appropriations.

SHIPBUILDING, MARINE, ETC.

STEAMER "LIMAO".—The new steamer *Limao*, built for the new French Yangtsze Line, has made her first trip up the river, from Shanghai.

"KAIJO-MARU'S" TRIAL TRIP.—The steamer *Kaijo-maru*, which has been built at the Kawasaki dockyard, Kobé, for the Osaka Shosen Kaisha, was taken on her trial trip recently, and attained a speed of 14.65 knots per hr. She is of 2,100 tons displacement, for 20 1st-class, 30 2d-class, and 272 3d class passengers.

REPAIRS TO TRANSPORT "SEWARD."—The Hongkong and Whampoa Dock Company, Hongkong, represented in Manila by Messrs. Findlay & Co., was recently awarded the contract for the repair of the U. S. A. T. *Seward*. The successful company's bid was $14,400, the work to be completed in 15 days.

FLOATING MINES IN THE YELLOW SEA.—The Chinese Government has taken steps for the discovery and destruction of floating mines in the Yellow Sea between Shanghai and the ports of N. China. This action was taken at the instance of the Diplomatic Corps at Peking and representatives of commercial bodies.

NEW COALING FACILITIES, JAPAN.—The Brown Hoisting Machinery Company of Cleveland, O., has sold, erected, and put into operation for the Kyushu Railway Company, at Tobata, in the Harbor of Wakamatsu, situated at the W. outlet of the Straits of Shimonoseki, two steam-hoisting machines of the Gantry crane type of 8,000 tons daily capacity, for the purpose of delivering coal from cars into seagoing vessels as cargo.

LAUNCH OF "DONA FRANCISCA," MANILA, P. I.—The new coastwise steamer *Doña Francisca* was launched recently at the shipyard of the San Nicolas Iron Works, Manila. The new vessel is a sister ship of *Juan Rodriguez*, at present under charter of the Quartermaster's Department of the army. She was built from the designs of her owner, Señor Juan Rodriguez, and is a ship of 550 tons displacement. She is 150′ in length, has a beam of 24′, and a depth of 13′.

HUGE SHIPPING CORPORATION, JAPAN.—The following lines of the Japanese Shipowners' Association have coöperated their interests:—Kobé-Otaru-Saghalien; Yokohama-Moji; Yokohama-Muroran Kushiro; Osaka-Korea; Kobé-North China; Yokohama-North China; Kobé-Vladivostock; Kobé-Dairen; Kobé-Formosa; Kobé-Shanghai; Chefoo-Vladivostock; Yokohama-Philippine Islands; Japan-China-India. The new company will have 132 liners, with an aggregate tonnage of 282,747.

MANILA-JAPAN STEAMSHIP LINE.—According to *The London and China Express*, a steamship line, financed in Japan, is to be inaugurated between Manila and Japanese ports. One of the promoters of the enterprise is Señor Don Raphael de Castro Midalgo, of Manila, who is now in England to purchase six steamships having a gross tonnage of about 2,000 tons each. The service that it is proposed to establish will be a triweekly one. Yokohama will be the main Japanese port of the line, and calls will also be made at Kobé and Nagasaki.

MINES AND MINING

GOLD EXPORTS, BRITISH GUINEA.—The gold export from this country in 1905 amounted to 104,887 ozs. as against 90,709 ozs. in 1904.

MINERAL DEPOSITS, MANCHURIA.—The Governor-General of Mukden is coöperating with the Japanese in their work of opening up the mineral resources of Manchuria, be heading an internal loan with this object in view.

MINERALS IN HONGKONG.—Important mineral deposits are to have been discovered in new British territory on the Chinese mainland opposite to the City of Victoria. Among other unsuspected hidden treasures on the Kowloon shore, great pockets of iron ore have been uucovered.

COPPER AND LEAD, YUNNAN.—The Minister of Mines in Yunnan has been directed to supply more copper and lead to the Chinese Government from the mines in his province, as the supply in hand is inadequate. He is required to provide 5,000,0.0 *catties* more annually than at present.

ROYALTY ON GOLD, PAHANG, F. M. S.—In view of the fact that the gold-mining industry in Pahang has had a very lean year, the 1905 exports of 9,661 ozs. being the lowest record for over a decade, the rule under the Customs Enactment just made continues the reduced rate of royalty.

COPPER AND LEAD, YUNNAN.—The Minister of Mines in Yunnan has been directed to supply more copper and lead to the Chinese Government from the mines in his province, as the supply in hand is inadequate. He is required to provide 5,000,000 *catties* more annually than at present.

ANHUI MINING CONCESSION, CHINA.—The Peking officials who are natives of Anhui are memorializing the Wai-Wu-Pu to approach the Throne regarding the cancellation of the British contract for mining privileges at Tung-kuan-shan in Anhui, as the time has long since expired for them to be worked and nothing has been done, so that the gentry and merchants are protesting.

PETROLEUM PRODUCTION IN BURMA.—The total production of oil in Burma in 1905 was 115,903,804 galls., or about 30,500,000 galls. in excess of that in 1904. A sign of the development of the Burma oil industry is the inclusion in the licenses to prospect for oil of new conditions providing for the supply of oil for the requirements of the British Admiralty, and for the refining of oil for British warships.

MINING IN BRITISH NEW GUINEA.—The mining outlook in British New Guinea is reported to be not encouraging. One company, in 1901, crushed 11,978 tons for a return of 3,808 ozs; another company crushed 4,388 tons for 3,·88 ozs, of an average value of £3 5s 3d per oz. But what appears to be a rich field has been discovered near Suloga Bay, on Woodlark Island. In his latest annual report the administrator, Captain Barton, states that 65 tons of ore taken from one claim yielded 599 ½ ozs of gold, which is equal to 9 ozs. 4 dwts. 12 grs. per ton. Whether the rich character of the output can be maintained remains to be demonstrated.

INDIAN GOLD MINING RETURNS.—The following are the returns for the month of February, 1906:—*Balaghat*, 4,200 tons of quartz crushed yielded 3,368 oz. and 2,750 tons of tailings cyanided yielded 275 oz., making a total of 3,643 oz. of gold.—*Champion Reef*.—Milled 16,990 tons which produced 12,707 oz., 15,975 tons of tailings treated by the cyanide process produced 2,179 oz. and scrapings from plates, No. 2 mill, 1,500 oz., making a total production of 16,386 oz. of gold. *Hutty Nizam's*.—768 oz. from 1,850 tons of quartz crushed and 270 oz. from 1,850 tons of tailing cyanided, making a total of 1,038 oz. of Gold estimated value Rs. 59,500. *Mysore*.—15,150 tons of quartz crushed produced 14,740 oz. and 12,750 tons of tailings cyanided yielded 1,736 oz., making a total production of 16,477 oz. of gold. *Mysore West*.—Mill ran 571 hrs., crushed 1,395 tons and yielded 840 oz. bar gold, cyanided 2,016 tons of tailings yielded 120 oz. standard gold. Total production 960 oz. of gold. *Nundydroog*.—6,200 tons of quartz crushed yielded 4,964 oz. and 6,480 tons of tailings cyanided yielded 579 oz., making a total production of 5,543 oz. of gold. *Ooregum*.—Staff crushed 9,696 tons, gold produced 4,627 oz. and slimes and tailings cyanided yielded 10,083 oz., making a total return of 5,529 oz. of gold.

MISCELLANEOUS NOTES

NETHERLANDS TRADING SOCIETY.—The Netherlands Trading Society intends to open an agency in Hongkong.

SUGAR EXPORTS, BRITISH GUIANA.—The sugar exports from this country in 1905 amounted to 133,000 tons, as against 108,000 tons in 1904.

CHINESE MISCELLANY.—Needles, bar soap, candles and looking-glasses are in great demand throughout China. The present supply is greatly inadecuate to the demand.

NEW ENTERPRISES, CHINA.—During 1905 62 new commercial undertakings were registered by the Chinese Government, being an increase of 53 over those registered in 1904.

OPENING OF CHENGTU, CHINA.—The viceroy of Szechuan Province, China, has recommended that the opening of Chengtu be postponed till the railways of the province are built.

KNITTING MACHINERY NEEDED IN JAPAN.—As the Japanese are rapidly becoming weavers of knitted goods, there promises to be a splendid field there for the sale of knitting machinery.

BIG ARSENAL IN JAPAN.—The construction of an arsenal for Messrs Armstrong & Co. has been commenced at Hiratsuka, Sagami Province, Japan. The cost is estimated at -Y- 50,000,000.

KUALA SELANGOR (F. M. S.) OIL MILLS.—It is stated that these mills are now doing exceedingly well financially, and that they are to be turned to further use, *viz:* for the manufacture of coir rope.

CONCRETE APPARATUS.—Mr. J. E Hall, engineer, of 5 Grange-rd, Singapore, has been authorized to file a specification of an invention for an apparatus for the purpose of making and placing in position piles or columns of concrete or other suitable material.

SIAM ELECTRICITY COMPANY, LTD., BANGKOK.—The gross profits of this company for 1905 were Tcs. 880,909.45, and the net profits Tcs. 592 908.83. Adding to this the balance for 1901 (Tcs. 23.103 70) the total sum at the disposition of the company is Tcs. 616,011.53.

COLD STORAGE FOR BANGKOK.—Mr. C. G. Edwards, who returned recently to Bangkok from England, has made arrangements, in connection with the Oriental Hotel Importation Company, for the establishment of cold storage transit to, and cold storage in, Bangkok.

OIL TRADE, PHILIPPINE ISLANDS.—British consul at Manila states that practically the whole of the oil trade of the Philippine Islands is divided between the United States and Russia, and consists of kerosene and other oils. Their respective imports during 1905 were United States £84,790 and Russia £70,092.

YALU TIMBER COMPANY.—Some twelve native timber merchant firms have petitioned Viceroy Yuan for the establishment of timber company in co-operation with the Japanese on the right bank of the Yalu River, with a capital of Tls. 1,000,000. This has been sanctioned, and 10,000 shares of 100 taels each are to be raised, and the subscription is now open inviting subscribers.

GOLD AND SILVER PAPER MILL, SHANGHAI.—Mr. Li Shisan, a millionaire merchant of Shao-hing-fu, Province of Chekiang, China, is establishing near Shanghai a factory for the manufacture of gold and silver paper. He has engaged the services of Professor Okubo of the Tokyo Technical College, as chief engineer of the industry, and a paper machine of the professor's own invention will be installed.

MESSRS. W. F. STEVENSON & CO., MANILA, ILOILO, AND CEBU, P. I.—This wellknown firm is in a favorable position to fill indents for various kinds of goods, such as rubber goods, leather, machinery, agricultural and otherwise; furniture, safes, metals, printing and other paper, hay, oats, corn, etc., etc Orders will be filled promptly, and at the lowest possible prices, and the firm guarantees satisfaction. The head office of Messrs. W. F. Stevenson & Co., is in Manila.

RICE FACTORIES, BURMA.—Nine new rice mills were built in Burma in 1905, four in Rangoon and the rest in the Lower Burma districts. There are now 202 factories in Burma under the operation of the Factories Act, 1881 More than ½ of these are in Rangoon. The total number of operatives employed increased from 32,345 to 31,970, of whom 21 035 were employed in Rangoon Town. Their health and treatment were reported to be satisfactory except in the government press, Rangoon, where the conditions of work were unfavorably criticized.

STANDARD OIL'S ISLAND IN CHINA.—The customs taotai of Amoy was recently impeached by officials in Peking for mortgaging a small island in the vicinity of Amoy to the Standard Oil Company of New York for storage of kerosene oil. The American consul-general at Foochow has, it is reported, refused to return the island on the ground that the company has already built oil tanks and other structures thereon. The Chinese director-general of railways in Fo-kien Province insists on recovering the island on the pretention that it is needed for railway purposes.

FARM MACHINERY, SAN RAMON, MINDANAO, P. I.—The agricultural farm at San Ramon, Mindanao, which is under the management of the Government of the Moro Province, is proving its value under the direction of Captain White, U. S. Army. It is now equipped with a copra-drying kiln and a machine for shredding the husks of cocoanuts, which equipment is rapidly proving the advantages of modern methods in the cultivation and preservation of the cocoanut. The main purpose of this farm is to provide cocoanut and hemp seed of the best quality adapted to that district.

MACHINERY IN MANCHURIA.—The prospect of introducing some simple type of hand-power woodworking, cotton spinning and weaving, rope-making and silk-weaving machinery into Manchuria is fairly inviting at the present time, but until the mines and industrial enterprises are exploited machinery on a large scale will not be in extensive demand. In N. Manchuria flouring mills have been successfully established by the Russians, and in the extracting of oil from beans, particularly in S. Manchuria, large numbers of hand presses are used.

LUZON SUGAR REFINING COMPANY, LTD., HONGKONG.—Messrs. Jardine, Matheson & Co., general agents of this company, in their annual report to the directors state that work was commenced in the refinery at Malabon, P. I., in April, 1905. The decline in the value of sugar all over the world adversely affected the price obtainable for refined product in Manila, and the loss on working, including $17.983 expenses incurred in restarting the refinery, amounted to $26,692.47, increasing the sum at debit of profit and loss account to $132,588 10. Messrs. A. G. Wood and H. P. White have been reelected members of the consulting committee.

LUMBER FOR THE ORIENT.—Henry Hewitt, Jr., the largest individual owner of timber lands in the State of Washington, U S. A., has organized a company to build one of the largest lumbering plantf in the state. The lumber and timbers turned out will be cut with special reference to the needs os Chinese builders. Several wealthy Chinese of Shanghai are stockholders in the concern, and will manage the distribution of lumber at Shanghai, Hankow, Canton, Amoy and other cities. The company intends to operate its own line of lumber-carrying steamships, and it will require 2 yrs to consumate the present plans and establish lumber yards throughout China.

FINANCIAL NEWS

CHINA BORNEO COMPANY.—The profits of this company for 1905 amounted to $20,848.27.

HONGKONG ROPE MANUFACTURING COMPANY, LTD.—This company has declared a dividend of $9 per share.

JAPANESE LOAN TO KOREA.—The Crédit Mobilier of Japan has signed the contract for a -Y-10,000,000 industrial loan to Korea.

KIANGSI RAILWAY BANK, CHINA.—Headquarters of the Kiangsi Railway Bank are to be established at Kiukiang, with branches at Shanghai, Hankow, and Newchwang.

YANGTSZE WHARF AND GODOWN COMPANY, LTD.—The statement of accounts for 1905 of this company, whose paid-up capital is Tls. 250,000, shows a divisible balance of Tls. 75,998. A dividend of 18 per cent has been declared.

STRAITS SETTLEMENTS SYNDICATE, LTD.—The Straits Settlements Syndicate, Ltd., has been registered in London with a capital of £2,000 in £ shares, to carry on the business of bankers, capitalists, financiers, etc. There is no initial public issue.

COTTON SPINNING COMBINE, JAPAN.—Through the efforts of Baron Shibusawa and Mr. Iida Giichi, arrangements have been made for the amalgamation of the Osaka Spinning Company, the Mie Spinning Company, and the Osaka Calico Factory.

SHANGHAI AND HONGKEW WHARF COMPANY, LTD.—During 1905 this company issued 6 per cent debentures to the amount of Tls. 190,600, and the total liabilities at the end of the year were Tls. 734,500 A final dividend at Tls. 8 per share, absorbing Tls 256,000, has been declared.

NATIONAL BANK OF CHINA, LTD., HONGKONG.—The gross profits of this institution for 1905, including $41,768 26 brought forward from the previous year, were $305,257.76. The bank will continue its exchange business and untill the reserves are built up to $600,000 no dividend will be declared.

YANGTSZE INSURANCE COMPANY.—Messrs. Shewan, Tomes & Co., Hongkong agents of this company, have been notified that the company will pay a dividend of 20 per cent, a special dividend of 5 per cent, and add $50,000 to the reserve fund as a result of the business during the past year.

CHINA LIGHT AND POWER COMPANY, LTD., HONGKONG.—The gross profits of this company for the year ended February 28th amount to $68,081.09, and the net profits, including the amount brought forward from the previous year, and allowing for depreciation and payment of interest and other charges, amount to $31,219.89, which it is intended to appropriate as follows:—To pay a dividend of 6 per cent, $30,000; to carry forward to current year's account, $1,219.89.

INDUSTRIAL BANK OF JAPAN.—Concerning the investment of capital in this bank by foreigners, the plan is to induce leading financiers abroad to have direct interest in the bank by becoming shareholders to the extent of -Y-7,500,000 out of -Y-17,500,000. The authorized capital is -Y-10,000,000, divided into 100,000 shares of -Y-100 each, and it is intended to alter these shares into -Y-50 shares, making the total number of shares owned by the Japanese 200,000. Over this, -Y-7,500,000 capital, divided into 150,000 -Y-50 shares, is to be increased and owned by foreign capital. By this arrangement the bank becomes an international institution.

HONGKONG ICE COMPANY, LTD.—The 25th ordinary annual meeting of the shareholders of this company was held recently at the office of the general managers, Messrs. Jardine, Matheson & Co. The chairman, the Hon. Mr. C. W. Dickson, said:—"Our sales of ice, both to steamers and for private consumption, were larger than during 1904, and revenue derived from cold storage also shows a satisfactory increase. To meet the demands of this branch of our business an addition store was installed during the yr. and the completion of another, making five in all, is about to be undertaken. Seven new ice boxes are now in course of erection. Mr. Thos. Arnold was reelected auditor for the current yr.

CHINA AND MANILA STEAMSHIP COMPANY, LTD.—The annual report of the general managers of this company, Messrs. Shewan, Tomes & Co., Hongkong, for 1905, shows that the net profit was $16,563.45, which has been appropriated as follows:—To reserve fund, $1,000; to pay a dividend of $1.50 per share, $9,000; to current year's account, $6,563.45. The two steamers *Rubi* and *Zafiro* ran regularly during the year. Cargo was scarce and freights ruled low, but expenses were reduced in every possible way, with the result that the profit on working account was a few thousand dollars better than that of 1904. Messrs. N. A. Siebs, D E. Brown, H. P. White, and A V. Apcar retired as members of the consulting committee and were reelected.

YOKOHAMA SPECIE BANK, LTD.—The gross profits of this bank for the half-year ended December 31st, 1905, including -Y-609,720,708 brought forward from previous accounts, amounted to -Y-10,532,084 708 of which -Y-7,213,063.048 have been deducted for current expenses, interest, etc., leaving balance of -Y-3,318,-115.338. By the addition of -Y-360,000 to the reserve fund, the latter is raised to -Y-10,200,000. -Y-1,000,000 have been appropriated as a newly created special reserve fund, and -Y-200,000 placed to the silver funds. From the remainder a dividend at the rate of 12 per cent, which will absorb -Y-720,000 on old shares and -Y-360,000 on new shares (total, -Y-1,080,000), has been declared; and the balance, -Y-688,116.338 has been carried forward to current account.

CHINA SUGAR REFINING COMPANY, LTD., HONGKONG.—Messrs. Jardine, Matheson & Co., general agents of this company, report that at the end of 1905, inclusive of $42,812.75 brought forward from 1904, the sum at credit of profit and loss account was $1,405,179.68. Deducting the interim dividend of 10 per cent paid August 18th last, $1,205,419.68 was available for appropriation, and this sum was dealt with as follows:—Final dividend of $15 per share, $300,000; transfer to reserve fund, $850,000; to bonus to European staff, $15,000; carried forward, $40,119.68. The steady fall which occurred during the year in values of raw sugar and the uncertainty as to the future course of prices, rendered it necessary to provide a large sum against forward purchases, hence the transfer of $850,000 to the reserve fund, which will be used for the purpose of writing down such commitments.

TARLAC (P. I.) TRAMWAY COMPANY, LTD.—The prospectus of this company was recently issued. The company is founded for the purpose of building and operating a steam tramway line from Paniqui to Camiling in the Province of Tarlac, N. Luzon, P. I. It is regularly incorporated under the laws of the Philippine Islands with a capital stock of ₱150,000, Philippine currency, divided into shares of ₱100 each. The franchise indicates the right-of-way as being from the Manila & Dagupan Railway station in Paniqui, through the barrios of Salomague, Cabayaunsan, Aduas, Barang, Mabilog, Marini, Matubog, and Nibalio, to the town of Camiling The tramway will be a narrow-gauge line (with the option of increasing the gauge), and will pass through some of the finest rice-producing country in the Philippine Islands. As shown by the report of the company's engineers the proposed tramway is to be 12¼ ms. long, and it is estimated that the entire line can be built and equipped for service for ₱125,788. It is calculated that the operating expenses of the road will not exceed ₱24,000 *per annum.* About 24,000 tons of freight and 36,000 passengers will probably be handled during this period. This line will be constructed by the Manila Construction Company, of which Mr. H. C. Thurber, C. E., is manager.

JAPANESE AND EASTERN CORPORATION, LTD.—The details of this new investing undertaking, which has been floated in London for the purpose of establishing a general financial and trust business for the investment of capital in Japan and the Far East generally, but mainly to aim at obtaining the financing of important schemes and undertakings, such as docks, tramways, etc., are as follows:—The issue has been made of £1,000,000 5½ per cent profit-sharing perpetual debenture stock, at a premium of 5s. per £ stock. The holders of perpetual debenture stock will be entitled to 5½ per cent cumulative interest on the amount paid up on the stock, and, in addition thereto, to a sum equal to one moiety of the balance of net profits available for dividend in any one year after the payment of such 6½ per cent and after a sum not exceeding 10 per cent of the net profits has been set aside for a reserve fund. The other moiety will be available for dividends on the ordinary shares. The nominal capital of the company is £50,000 divided into 50,000 ordinary shares of £1 each, 30,007 of which have been allotted. The debenture stock now offered for subscription will be insured in the Norwitch Union Life Insarance Society, by means of a capital redemption policy securing the repayment, in full, of the premium, in addition to the full face value of the stock—that is, £1 5s. for each £1 of stock subscribed.

MESSRS. RILEY, HARGREAVES & CO., LTD., SINGAPORE.—The seventh ordinary meeting of this company was held recently in Singapore. There were present at the meeting Mr. W. M. Robertson, managing director and chairman, and Mr. C. E F. Sanderson, director; Mr. T C. B. Miller, secretary; the Hon. W. J. Napier, and others. The secretary read the minutes calling the meeting, and the minutes of the last ordinary meeting, which were confirmed and signed. The minutes of an extraordinary general meeting, held June 30th, 1905, were also confirmed and signed The report on the accounts for 1905 having been taken as read, the chairman said that he had been prepared to make a few remarks giving further particulars, but that, having received from an influential shareholder a letter giving notice of certain questions to be asked at the meeting he thought that if these questions, and the directors' replies to them were now given, any information desired by the shareholders would be best afforded thus. He therefore invited the Rev. Father Couvreur to put those questions, which was done. The chairman then gave the information required as to certain items in the accounts, and Father Couvreur expressed himself as being in the main satisfied and appeared to think that the company's affairs were in better condition than shown. The accounts were then put to the meeting, and, after a little discussion, adopted. Mr. Jackson Millar, retiring by rotation, was re-elected to a seat on the board and Mr J. van Lohuizen was elected a director of the company. Messrs Gunn & Co., and W Buchannan Smith were re-elected as auditors. A vote of thanks to the chairman terminated the meeting.

FAR EASTERN SHARE QUOTATIONS

COURTESY OF BENJAMIN, KELLY & POTTS, SHAREBROKERS, HONGKONG. April, 1906.

STOCK	WHEN ESTABLISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation* PER CENT	CLOSING QUOTATIONS
Banks.												
Hongkong and Shanghai Banking Corporation	1865	$10,000,000	80,000	$125	$125	g £1,000,000 s $9,500,000 i $250,000	... $1,699,777	31-12-05	£1.15/- div. & £1 bonus (a ex. 2/0-9/16 $26.87 for second half-year 1905	26-2-06	5	$850 buyers London £87½
National Bank of China, Limited	1891	£699,475	99,925	£7	£5	$200,000	$41,768	31-12-04	$2 (London 3/6) for 1903	1-2-04	—	$40 buyers
Marine Insurances.												
Canton Insurance Office, Limited	1881	$2,500,000	10,000	$250	$50	$1,600,000 j $147,895	$211,540	31-12-04	$20 for 1904	21-10-05	6	$355 buyers
China Trader's Insurance Co., Ld.	1865	$2,000,000	24,000	$83.33	$25	$950,000 f $169,215 j $202,455 u $296,955	Nil.	30-4-05	$4½ for year ended 30-4-1905	18-12-05	4¾	$97
North China Insurance Co., Ld.	1863	£150,000	10,000	£15	£5	g £100,000 s Tls. 100,000 f Tls. 50,000	...Tls. 302,053	30-6-05	Final of 7/6 making 15/- for 1904	25-10-05	5½	Tls. 90 sales
Union Insurance Society of Canton, Limited	1867	$2,500,000	10,000	$250	$100	s $2,000,000 g £40,000 f $331,453 j $1,043,930 u $1,152,346	$2,339,112	30-6-05	$40 for 1904	20-10-05	5	$795 sellers
Yangtsze Insurance Association, Ld.	1862	$800,000	8,000	$100	$60	$750,000 i $50,000 j $5,890	$599,364	31-12-04	$12 and $3 special dividend for 1903	12-4-05	7¼	$177½ buyers
Fire Insurances.												
China Fire Insurance Co., Ld.	1870	$2,000,000	20,000	$100	$20	$1,000,000 x $229,488 f $2,616	$344,098	31-12-05	$6 for 1904	9-3-06	7	$86 buyers
Hongkong Fire Insurance Co., Ld.	1868	$2,000,000	8,000	$250	$50	$1,221,928	$422,618	31-12-05	$25 for 1904	8-3-06	8¼	$300
Shipping.												
China and Manila Steamship Co., Ld.	1882	$750,000	(1) 30,000	$25	$25	$6,000	$6,563	31-12-05	$1½ for 1905	15-3-06	8	$18 sales
Douglas Steamship Co., Ld.	1883	$1,000,000	20,000	$50	$50	$261,638 i $88,941	Nil.	30-6-05	$3½ for year ended 30-6-1905	25-9-05	8½	$41 buyers
Hongkong, Canton and Macao Steamboat Company, Ld.	1865	$1,200,000	80,000	$15	$15	e $250,000 d i $600,000 f $145,331	$24,080	31-12-05	$1 for second half-year 1905	16-2-06	8¼	$25 sellers
Indo-China Steam Navigation Company, Ld.	1882	£1,200,000	(2) 60,000	£10	£10	£120,000 i £241,150 h £3,999	£4,435	31-12-04	12/- @ 1/10 7/8=$6.29.51 for 1904	13-7-05	6¾	$93½ buyers
Shanghai Tug and Lighter Co., Ld. Do. Preference	1903	Tls. 1,500,000	200,000 100,000	Tls. 50	Tls. 50	i Tls. 40,000	... Tls. 23,156	31-12-05	Final of Tls. 3. making Tls. 5 for 1905 Final of Tls. 1¾ making Tls. 3½	13-3-06	8½ 7	Tls. 58 buyers Tls. 50 buyers
"Shell" Transport & Trading Co., Ld.	1898	£2,000,000	2,000,000	£1	£1	£400,000 i £4,144	£7,815	31-12-04	1/- (Coupon No. 6) for 1905	1-1-06	4¼	24/- buyers
"Star" Ferry Co., Ld.	1898 1900	$200,000	10,000 10,000	$10 $10	$10 $5	$65,000 i $24,257	$929	30-4-05	$1.80 / 90 cents for year ended 30-4-1905	29-5-05	5¾ 4	$32 $23
Taku Tug & Lighter Co., Ld.	—	T.T 1,500,000	30,000	Tls. 50	Tls. 50	Tls. 98,000 d Tls. 350,479 e Tls. 48,000 i Tls. 81,200	... Tls. 13,913	31-12-05	Final of Tls. 2 making Tls. 4 for 1905	1-3-05	11½	Tls. 35 buyers
Refineries.												
China Sugar Refining Company, Ld.	1878	$2,000,000	20,000	$100	$100	$850,000 e $450,000 r $86,129	$40,419	31-12-05	Final of $15 making $25 for 1905	22-3-06	14	$180 buyers
Luzon Sugar Refining Company, Ld.	1882	$700,000	7,000	$100	$100	none	$85,987	31-12-04	$3 for 1897	24-3-98	—	$35 sellers
Perak Sugar Cultivation Co., Ld.	—	Tls. 350,000	7,000	Tls. 50	Tls. 50	Tls. 100,000	... Tls. 3,723	31-7-05	Tls. 2½ for year ending 30-9-1904	17-12-04	—	Tls. 10 Sales
Mining.												
Chinese Engineering & Mining Co., Ld.	1901	£1,000,000	1,000,000	£1	£1	d £80,000 h £12,289	£13,355	28-2-05	Final of 1/- (No. 5)	2-11-05	—	Tls. 10
Oriental Consolidated Mining Co., Ld.	1901	G.$5,000,000	y 500,000	G. $10	G. $10	none	G. $909,050	30-6-05	Final 50cts. mak. G. $1 for 1905	21-12-05	—	G. $16
Raub Australian Gold Mining Co., Ld.	1892	£200,000	150,000 50,000	£1 £1	18/10 £1	£4,873	£8,745	31-3-05	No. 12 of 1/-=48 cents	28-7-01	—	$3½

Stock	When Estab-lished	Capital	No. of Shares	Value	Paid Up	Reserve	At Working Account	Date	Last Dividend	When Paid	Approximate Return at Present Quotation* (Per cent)	Closing Quotations
Docks, Wharves and Godowns.												
Farnham (S. C.), Boyd & Co., Ld	1901	T5,520,000	55,200	T100	T100	T1,000,000	T34,924	30-4-05	Interim of Tls. 4 for year 1905-6	6-1-06	10	T118½ buyers
Fenwick (Geo.), & Company, Ld	1889	$450,000	*z* 18,000	$25	$25	$70,000	$8,915	31-12-05	$2 on old & $1 on new issue for 1905	12-3-06	9	$22½
Hongkong and Kowloon Wharf and Godown Co., Ld	1886	$2,000,000	40,000	$50	$50	$550,000 *d.r.* $65,160 *i* $20,000	$20,040	31-12-05	Final of $3½ making $6 for 1905	15-3-06	6	$100 buyers
Hongkong & Whampoa Dock Co., Ld	1866	$2,500,000	50,000	$50	$50	$49,500	$362,323	31-12-05	$6 for second half year 1905	27-2-06	7¼	$165
New Amoy Dock Co., Ld	1892	$67,500	10,000	$6¾	$6¾	$88,000	$2,221	31-12-05	$1 for 1905	1-3-06	6	$17 buyers
Shanghai and Hongkew Wharf Co. Lt	1902	T3,200,000	32,000	T100	T100	*b* T487,210 *r* T100,734	T57,065	31-12-05	Final of T8 making T14 for 1905	29-3-06	6½	T210 ex div.
Vulcan Ironworks, Ltd.	1905	T500,000	1,000	T500	T375	—	—	—	First year	—	—	T375 buyers
Yangtsze Wharf and Godown Co., Ld.	1902	T250,000	2,500	T100	T100	T17,500	T2,762	31-12-04	T18 for 1904	29-3-05	7¾	T230 buyers
Lands, Hotels and Buildings.												
Anglo-French Land Investment Company, Ltd	1906	T2,500,000	(3) 25,000	T100	T100	—	—	—	First year	—	—	T100
Astor House Hotel Co., Ltd.	1901	$750,000	(4) 30,000	$25	$25	$14,156	$9,028	30-6-05	$2½ for year ending 30-6-1905	19-8-05	8¼	$30
Astor House Hotel, Ld. (Tientsin)	—	T100,000	2,000	T50	T50	T34,000 *e* T8,000	T806	29-2-05	Interim of T5	21-10-05	8	T130 buyers
Central Stores, Ld.	—	$451,845	6,000	$15	$15	—	$4,719	31-12-05	$2.40 on $12 for 1905	13-3-06	13½	$18
Do. (Founders')	—		123	$15	$12				None	—	—	$300 buyers
Do. (New Issue)	1904		24,000	$15	$15				7% on $7½ for 1905	13-3-06	—	$15¼ buyers
Hongkong Hotel Co., Ld.	1866	$600,000	12,000	$50	$50	$648,975 *r* $24,071	$619	31-12-05	$5 for second half-year 1905	6-3-05	7½	$133 buyers
Hongkong Land Investment and Agency Co., Ld.	1889	$5,000,000	50,000	$100	$100	*e* $250,000	$67,839	31-12-05	Final of $3½ making $7 for 1905	2-2-06	6	$115
Hotel des Colonies Co., Ld.	1902	T225,000	9,000	T25	T25	*n* T20,986	T7,202	31-3-05	Interim of T1	11-1-05	14	T17
Hotel Metropole Company, Limited	1904	$200,000	2,000	$100	$100	none	$4,699	30-6-05	Final of $6 making $10 for the year	26-7-05	10	$100
Humphreys' Estate & Finance Co., Ld.	1887	$1,500,000	150,000	$10	$10	*i* $208,386 *e* $50,000	$5,070	31-12-05	80 cents for 1905	12-2-06	7	$11½
Kowloon Land and Building Co., Ld.	1889	$300,000	6,000	$50	$30	none	$574	31-12-05	$2½ for 1905	7-2-06	6½	$39
Shanghai Land Investment Co., Ld.	1901	T2,600,000	52,000	T50	T50	T909,593 *e* T170,000	T52,194	31-12-05	Final of Tls. 3 making T6 for 1905	20-2-06	5	T117 buyers
Tientsin Land Investment Co., Ld.	1902	T772,600	7,726	T100	T100	*i* T71,588	T385	31-12-05	Final of Tls. 5 making Tls. 8 for 1905	24-2-06	7	T110
West Point Building Co., Ld.	1889	$625,000	12,500	$50	$50	none	$772	31-12-05	Final of $1.90 making $3.65 for '05	2-2-06	7	$53
Cotton Mills.												
Ewo Cotton Spinning and Weaving Co., Ld.	1895	T1,000,000	(5) 20,000	T50	T50	T45,939	T100,000	31-10-05	T8 for year ended 31-10-1905	18-12-05	12½	T64 sellers
Hongkong Cotton Spinning, Weaving and Dyeing Co., Ld.	1901	$1,250,000	125,000	$10	$10	*e* $30,000	$23,264	31-7-05	$1 for year ended 31-7-1905	4-9-05	6	$16 buyers
International Cotton Manufacturing Co., Ld.	1895	T750,000	(6) 10,000	T75	T75	T100,000	T18,718	30-9-05	Interim of 3% a/c 1898	30-4-98	—	T61 buyers
Laou-kung-mow Cotton Spinning & Weaving Co., Ld.	1895	T800,000	(7) 8,000	T100	T100	none	T30,760	31-12-05	Tls. 8 for 1905	21-2-06	12	T67½ sellers
Soey Chee Cotton Spinning Co., Ld.	1895	T1,000,000	2,000	$500	$500	*l* T18,456	T35,986	31-12-05	Tls. 25 for 1905	7-3-06	8¼	T300 sales
Miscellaneous.												
Anglo German Brewing Co., Ltd.	1904	$100,000	4,000	$100	100	none	$1,066	31-12-05	$7 for 1905	1-3-06	7	$100 sales
Bell's Asbestos Eastern Agency, Ld.	1895	£5,377.10s	8,604	12/6	12/6	£314	£770	31-12-04	1s. 3d for 1904	21-7-05	9	$7¼
Campbell, Moore & Co., Ld.	1886	$12,000	1,200	$10	$10	$8,000	$1,182	31-12-04	$3 for 1904	1-4-05	8¼	$36
China-Borneo Co., Ld.	1903	$720,000	(8) 60,000	$12	T12	none	Nil	31-12-05	$1 for 1904	17-3-05	—	$7 buyers
China Flour Mill Co., Ld.	—	T200,000	4,000	T50	T50	T50,000	T889	31-12-05	Final of T 5 making T 10 for 1905	17-3-06	12½	T80 buyers
China Light and Power Co., Ld.	1901	$500,000	50,000	$10	$10	none	$3,739	29-2-05	None	—	—	$10
China Provident Loan and Mortgage Co., Ld.	1898	*a* $1,000,000	100,000	$10	$10	$100,000	$4,791	31-12-05	80 cents for 1905	22-1-06	9	$9
Dairy Farm Company, Ld.	1896	$187,500	25,000	$7½	$6	$25,000	$2,864	31-7-05	1.20 for year ending 31-7-1905	24-11-05	7½	$16

STOCK	WHEN ESTABLISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation* PER CENT	CLOSING QUOTATIONS
Miscellaneous.—Continued												
Green Island Cement Co., Ld.	1889	$1,500,000	150,000	$10	$10	*p* $410,000 / $500,000	$52,291	31-12-05	$2 div. & 50 cents bonus for '05	26-2-06	8¼	$30 sales
Hall & Holtz, Ld.	—	$420,000	21,000	$20	$20	$186,000	$7,551	29-2-05	Final of $1½ making $2½ for the year	15-4-05	11¼	$22 buyers
Hongkong Electric Co., Ld.	1889 / 1899	$600,000	30,000 / 30,000	$10 / $10	$10 / $10	none	$2,151	30-4-05	$1.00 / 50 cents for year ending 30-4-05	17-7-05	6 / —	$16¾ / $16
Hongkong High-Level Tramways Co., Ld.	1887	$125,000	1,250	$100	$100	$50,000	$2,796	30-11-04	$15 for year ending 30-11-04	24-12-04	7	$215 buyers
Hongkong Ice Company, Ld.	1881	$125,000	5,000	$25	$25	*k* $80,000	$3,776	31-12-05	Final of $15 making $19 for 1905	16-2-06	8	$235 buyers
H'kong Rope Manufacturing Co., Ld.	1883	$500,000	10,000	$50	$50	$61,000	$5,813	31-12-05	$9 for 1905	15-3-06	6¼	$143
Hongkong Steam Waterboat Co., Ld.	1900	$150,000	15,000	$10	$10	$2,500	$88	30-9-05	Final of 50 cents making $1 for year ended 30-9-1905	24-11-05	10	$10 sellers
Maatschappij tot Mijn-, Bosch-en Landbouwexploitatie in Langkat	1902	Gs.2,500,000	25,000	G.100	G.100	*i* T528,210 / T19,465	T35,849	31-10-04	First quarterly dividend of T7½ account 1906	15-3-06	11	T222½ buyers
Mondon, (E. L.) Ld.	1902	T350,000	7,000	T50	T50	none	*Dr.* T117,638	31-12-04	T5 for 1902	2-5-03	—	T25
Philippine Company, Ld.	1904	$675,000	67,500	$10	$10	none	*Dr.* P34,324	31-12-05	None	—	—	$5 buyers
Shanghai Gas Co., Ld.	1903	T800,000	16,000	T50	T50	*d* T165,000	T11,017	31-12-05	T3 final & T1½ bonus making in all T8½ for 1905	7-3-06	6½	T132½ sales
Shanghai Horse Bazaar Co., Ld.	1904	T270,000	5,400	T50	T50	T45,000	T9,751	31-12-04	T6 for 1904	17-3-05	9	T67½
Shanghai Pulp and Paper Co., Ld.	—	T450,000	4,500	T100	T100	*e* T37,000 / T8,000	T2,753	31-12-05	Final of T8 making T14 for 1905	27-2-06	9	T150 sellers
Shanghai Sumatra Tobacco Co., Ld.	1902	T600,000	(9) 30,000	T20	T20	*w* T24,820 / T25,000	T1,452	31-10-05	Final of T3 making T5 for the year.	15-3-06	9	T56½ buyers
Shanghai Waterworks Co., Ld.	1881	£288,000	7,200 / 7,200	£20 / £20	£20 / £5	T170,000	T17,220	31-12-04	Interim of 15/- for 1905 / First year	27-7-05 / —	— / —	T450 ex new / T200 buyers
South China Morning Post, Ld.	1903	$150,000	6,000	$25	$25	none	*Dr.* $5,068	29-2-05	None	—	—	$20 sellers
Steam Laundry Co., Ld.	1902	$100,000	20,000	$5	$5	none	$1,134	31-5-05	50 cents for year ended 31-5-05	20-11-05	8¼	$6
Tientsin Waterworks Co., Ld.	1901	T. T200,000	2,000	T. T100	T. T100	*e* T15,259 / T4,000	T1,012	30-4-05	Interim of T4 for year 1905/6	12-2-06	7¾	T. 110
United Asbestos Oriental Agency, Ld. / Do. do (Founders')	1896	$100,000	9,900 / 100	$10 / $10	$4 / $10	$22,000	$551	31-5-05	80 cents / $19.80 for year ended 31-5-05	29-7-05	9 / 11	$9 / $180
Watson (A. S.) & Co, Ld.	1886	$900,000	90,000	$10	$10	$300,000 / $25,000	$6,096	31-12-04	Interim of 50 cents for 1905	23-11-05	7¾	$13
William Powell, Ld.	1901	$150,000	15,000	$10	$10	*e* $4,500	$676	30-6-05	Final of 70 cents making $1.20 for year ended 30-6-05	2-10-05	11	$11

LOANS AND DEBENTURES	AGENTS FOR THE LOAN	AMOUNT OF LOAN	PAR VALUE	OUT-STAND'G BONDS	WHEN PAYABLE	CLOSING QUOTATIONS
China Government, 7 per cent. Silver Loan 1886 E.	Hongkong & Shanghai Bkg. Cor.	T767,200	T250	1914	Mar. 31st & Sept. 30th each year until Mar. 31st, 1917.	par. (Plus accrued interest)
Hongkong Hotel Co., Ltd., 6% Mortgage Debentures of 1899‡	Hongkong & Shanghai Bkg. Cor.	$500,000	$500	⅔ all	Half yearly, June 30th and December 31st	par. (Plus accrued interest)
Shanghai & Hongkew Wharf Company, Ltd. 6% Debentures of 1902	Hongkong & Shanghai Bkg. Cor.	T543,900	T100		Half yearly, June 30th and December 31st	T96 (Plus accrued interest)
Astor House Hotel Co., Ltd. 8% Debentures of 1903	Hongkong & Shanghai Bkg. Cor.	T500,000	T100		Half yearly, January 1st and July 1st	T105 (Plus accrued interest)
Chinese Engineering & Mining Co., Ltd., 6% Debentures of 1903†		£500,000	¶	£431,960	Half yearly, June 30th and December 31st	par. (Plus accrued interest)
International Cotton Manufacturing Co., Ltd. 6% Debentures of 1901	Russo Chin. Bk.	T500,000	T100	‖	Half yearly, March 31st and September 30th	par. (Plus accrued interest)

a Auhorized capital $2,000,000.
b Building Reserve Account.
c Capital Reserve Fund.
d Depreciation Fund.
e Equalization of Dividend Fund.
f Exchange and Investment Fluctuation Account.
g Gold Reserve Fund.
h Exchange Reserve Account.
i Insurance Fund.
j Reinsurance Fund.
k Contingencies Account.
l Legal Reserve Fund.
m
n Sinking Fund.
o
p Premium on New Issue.
q
r Repairs and Renewals Account.
s Silver Reserve Fund.
t
u Underwriting Suspense Account.
v
w Special Works Fund.
x Extra Reserve Fund.
y 72,560 owned by the Company.
z 6,000 shares unissued.
1 5,725 shares unissued.
2 First issue of 60,000 of which 10,411 unalloted.
3 5,000 shares unissued.
4 7,600 shares unissued.
5 5 000 shares unalloted.
6 1,616 shares unalloted.
7 842 shares unissued.
8 14,000 shares unissued.
9 17,000 shares unissued.
* Based on last year's dividend.
‖ Only Tls. 134,000 taken up.
⅔ 216 held by the Company.
¶ In certificates of £20 and £100.
‡ Redeemable in 10 years, or at option of Company the Company giving 6 months' notice.
† Redeemable at par at rate of £10,000 per annum from 31st December, 1903 to 31st December 1952.
Dr. Deficit.

NAME	DATE OF FORMATION	CAPITAL	CAPITAL PAID UP	NO. OF SHARES	ISSUE VALUE	PAID UP	RESERVE	LAST DIVIDEND	SINCE LAST MAIL HIGHEST	SINCE LAST MAIL LOWEST	CLOSING QUOTATIONS
									$	$	$
Mining.											
Bersawah Gold Mining Co., Ltd.	1900	$175,000	140,000	10,000 *1*	10	10					14.00 sellers
" " " " Deferred.				4,000	10	10					8.00 sellers
Bruseh Hydraulic Tin Mining Co., Ltd.	1901	$600,000	600,000	60,000	10	10					10.10 sellers
Kadana Gold Mining Co., Ltd.	1901	$300,000	300,000	20,000	10	10					2.00 sellers
" " " " *Pref.*				10,000	10	10					10.00 nominal
Kechau Goldfields, Ltd. *Fully paid*	1902	£30,000	16,175-7/-	6,207	1	1					in liquidation
" " " *Contrib.*				10,493 *2*	1	19/-					in liquidation
Kuantan Tin Mining Co., Ltd.	1905	$150,000	99,000	9,900 *3*	10	10			15.50	15.00	15.25 sales
Pahang Corporation, Ltd.	1889	£250,000	244,306	244,306 *4*	1	1	20,000	3% for year ending 30-6-02	1.75	1.50	1.75 sales & buyers
Pahang Kabang, Ltd.	1890	£375,000	375,000	360,000	1	1			0.25	0.20	0.25 buyers
" " " *Pref.*				15,000	1	1					nom.
Queensland Raub G. M. Co., Ltd. *Fully paid*	1901	£146,700	100,866	36,700	1	1					nom.
" " " " *Contrib*				110,000	1	11/8					nom.
Raub Aust. Gold Ming. Co., Ltd. *Fully paid*	1892	£200,000	191,250	50,000	1	1	4,873	1s. paid January, '01			2.50 sellers
" " " " " *Contrib.*				150,000	1	18/10		1s. " " "			2.50 sellers
Redjang Lebong Mining Co.	1898	f.2,000,000	1,800,000	18,000 *5*	100	100		32% for year ending 31-12-05			385.00 buyers
Royal Johore Tin Mining Co., Ltd.	1900	$220,000	220,000	22,000	10	10		5% for year ending 15-2-04			3.25 sellers
Sipiau Tin Co., Ltd.	1899	$230,000	230,000	23,000	10	10		5% for ½ year ending 30-6-05			7.00 sellers
The Belat Tin Mining Co., Ltd.	1903	$300,000	300,000	30,000	10	10			3.00	2.50	2.50 sellers
The Pusing Lama Tin Mines, Ltd.	1904	£120,000	98,000	98,000 *6*	1	1		6d. paid February, 1906			10.50 sellers
Tronoh Mines, Ltd.	1902	£160,000	149,185	149,185 *7*	1	1		7s. paid during 1905	18.00	17.50	18.00 buyers
Duff Development Co., Ltd.	1903	£400,000	350,000	350,000 *8*	1	1					6.00 sellers
Rubber.											
Anglo-Malay Rubber Co., Ltd.	1905	£150,000	140,000	140,000 *9*	1	1					£1 12s 6d
Balgownie Rubber Estate Ltd.	1905	$200,000	100,000	20,000	10	5			11.75	11.50	$11.75 sales
Batu Caves Rubber Co. Ltd. *Fully paid*	1904	£30,000	11,125	7,000 *10*	1	1					......
" " " " " *Contrib.*				11,000	1	7/6					£1 0s od.
Bukit Rajah Rubber Co. Ltd *Fully paid*	1903	£70,000	59,250	54,000 *11*	1	1					£3 15s. od. ......
" " " " " *Contrib.*				7,000	1	15/-					£3 10s. od.
Cicely Rubber Estates Co., Ltd.	1904	£12,000	10,500	6,000	1	1					£2 5s. od.
" " " 5% Pref.				6,000	1	15/-					£2 5s. od. ......
Consolidated Malay Rubber Estates, Ltd.	1905	£75,000	55,000	55,000 *12*	1	1					£1 17s. 6d. ......
Sione Rubber Company, Ltd.	1905	$100,000	88,000	8,800 *13*	10	10			17.00	16.50	$16.50 sellers
Sungei Way (Selangor) Rubber Co, Ltd.	1904	£50,000	15,670	6,920 *14*	1	1					£2 0s. od. buyers
" " " " *Contrib.*				35,000	1	5/-					£1 4s. od. buyers
The Batu Unjor Rubber Co., Ltd.	1905	$700,000	610,000	61,000 *15*	10	10			24.50	24.25	$24.50 sellers
The Pataling Rubber Estates Syndicate Ltd	1903	£30,000	20,000	20,000 *16*	1	1					£5 0s. od. buyers
The Ribu Planting Co., Ltd.	1904	$200,000	135,000	1,350 *17*	100	100					$270.00 ......
The Sandycroft Rubber Co. Ltd.	1904	$100,000	85,000	850 *18*	100	100					$260.00 ......
The Selangor Rubber Co., Ltd.	1898	£30,000	26,300	26,300 *19*	1	1					£8 0s. od. sales
The Singapore & Johore Rubber Co., Ltd.	1903	$100,000	91,500	150	100	100					$185.00 buyers
" " " " " " *Contrib*				850	100	90					$175.00 buyers
Vallambrosa Rubber Co., Ltd.	1904	£60,000	50,000	50,000 *20*	1	1					£5 0s. od. ......
General.											
Fraser & Neave, Ltd.	1898	$225,000	225,000	4,500	50	50	112,500	15% dividend for 1905	100.00	99.00	100.00 sales & sellers
Hogan & Co., Ltd.	1904	$480,200	334,800	3,348 *21*	100	100	5,000	7% for 1904			10.00 buyers
H'kong and Shanghai Banking Corporation	1865	$10,000,000	10,000,000	80,000	125	125	10,000,000 *25* 9,500,000 *26* 250,000 *27*	35s. and 20/- bonus for ½ year ending 31-12-05			800.00 buyers
Howarth Erskine, Ltd.	1901	$2,400,000	18,000	100	100				150.00	145.00	150.00 sellers
" " " 7% Pref.			6,000	100	100				115.00	110.00	110.00 buyers
Maynard & Co., Ltd.	1901	$34,000	34,000	3,400	10	10		15% for year ending 31-10-05			23.00 sellers
Riley, Hargreaves & Co., Ltd.	1899	$875,000	875,000	6,000	100	100	150,000	10% and 2½% bonus for year '04	150.00	115.00	130.00 sellers
" " " " 7% Pref.				2,750	100	100		7% for year 1904	115.00	110 00	110.00 ......
Singapore Cold Storage Co., Ltd.	1903	$600,000	240,000	24,000 *22*	10	10					9.00 sales
Singapore Dispensary Ltd.	1891	$30,000	30,000	600	50	50	19,000	12½% for year ending 31-7-04			70.00 sellers
Straits Ice Co., Ltd.	1884	$200,000	200,000	2,000	100	100	22,000	5% interim for 1905			160.00 buyers
Straits Steam Ship Co., Ltd.	1890	$500,000	421,500	5,000 *23*	100	100	400,000 169,228 *28*	10% for 1905			147.50 buyers
Straits Trading Co., Ltd.	1887	$3,000,000	2,500,000	250,000 *24*	10	10	700,000 1,021,395 *29*	10% & 5% bon. ½ yr. end. 30-9-05.	44.75	44.50	44.50 sales & sellers
Tanjong Pagar Dock Co., Ltd.	1864	$3,700,000	3,700,000	37,000	100	100	1,950,000	$6 for half year ending 31-12-05			480.00 ......
Debentures. $											
Howarth Erskine Ltd. 6 per cent ... 600,000											2% prem. buyers
Singapore Municipal 6 " ... 400,000											3% prem. buyers
" " 5 " ... 1,878,000											par buyers
" " 4 " ... 602,300											2% dis. nominal
Riley, Hargreaves & Co., Ld. 6 p. cent 225,000											2% prem. buyers
Tanjong Pagar Dock Co., Ld. 6 " 250,000											2% prem. buyers
" " " " 5 " 1,365,500											par buyers

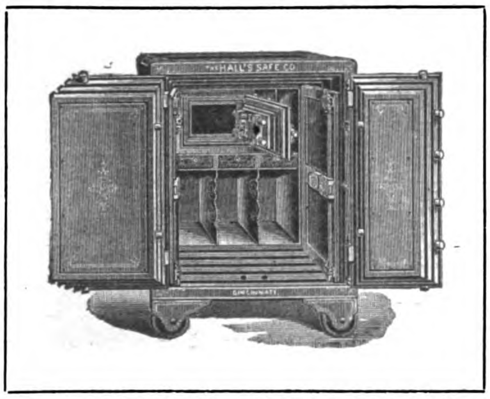
1 3,500 unissued. *2* 13,300 " *3* 5,100 " *4* 5,694 " *5* 2,000 "
6 22,000 unissued *7* 10,815 " *8* 50,000 " *9* 10,000 " *10* 12,000 "
11 9,000 unissued *12* 20,000 " *13* 1,200 " *14* 8,080 "
16 10,000 unissued Mort. £5,000 *17* 650 " *18* 150 " *19* 3,700 "
21 1,454 unissued. *22* 36,000 " *23* 785 " *24* 50,000 "
26 Silver Reserve Fund. *27* Insurance Fund. *28* Sundry Reserves. *29* Sundry Reserves.

YOKOHAMA SHARE QUOTATIONS

COURTESY A. C. HUTTON POTTS, SHARE AND GENERAL BROKER, YOKOHAMA, MARCH, 1906.

STOCKS.	CAPITAL.	NO. OF SHARES.	ISSUE VALUE.	AMOUNT PAID UP.	RESERVE FUND.	AT WORKING ACCOUNT OR CARRIED FORWARD.	DATE.	LAST DIVIDEND.	FOR TERM.	CLOSING QUOTATION.
	Y.		Y.	Y.						
Brett & Co., Limited	28,000	2800	10	10			30/6/03	6%	for 1 year	6.50 Sales.
Club Hotel, Limited	185,000	1850	100	100			31/3/04	7%	,, 1 year	60 Nominal.
Grand Hotel, Limited	250,000	2500	100	100		Y.6,179.25	31/12/05	10%	,, ½ year	225 Sales.
Helm Bros., Limited	186,000	3720	50	50		Y.6,235.70	31/12/05	17½%	,, 1 year	87½ Sellers.
Langfeldt & Co., Limited	150,000	1500	100	100		Dr.28,875.52	31/12/05		,, ½ year	45 Sellers.
C. Nickel & Co., Limited	500,000	20000	25	25		5,106.41	31/10/05	12%	,, 1 year	34 Sellers.
Japan Brewery Company, Limited	450,000	9000	50	50	200,000	8,702.28	31/12/05	20%	,, 1 year	130 Sellers.
Yokohama Engine and Iron Works	130,000	2600	50	50	20,000	Y.20,149.17	30/11/05	10%	,, ½ year	120 Sales.
Hirano Mineral Water Co., Ltd	125,000	5000	25	25				1st year		25 Sellers.
Oriental Hotel, Ltd., Old Ordinary		1490	50	50			31/8/05	12%	,, 1 year	75 Nominal.
,, ,, New ,,		1510	50	25						
,, ,, Old Preference	251,000	750	50	50	60,542.50			8%	,, 1 year	63 Sales.
,, ,, New ,,		1250	50	25						
,, ,, Founders	G	80	12½	12½				Y.37	,, 1 year	500 Sales.
Oriental Consolidated Mining Co., Ltd	$5,000,000	500,000	G.$10	G. $10	none	G. $672,093	31/12/04	G. $1.	,, 1905	G. $18 Sellers.
Raub Australian Gold Mining Co., Ltd	£200,000	150,000	£1	18/10	£4,873	Dr. £8,745	31/3/05	48 cts.	,, 1901	$3 Buyers.
		50,000	£1	£1						

DEBENTURE LOANS.	AMOUNT OF LOAN.	FACE VALUE OF DEBENTURES.	RATE OF INTEREST.	INTEREST PAYABLE.	CLOSING QUOTATION.
Japan Brewery Company, Limited	200,000.00	100.00	7%	1 April and 1 October.	108 Sales.
Brett and Company, Limited	11,500.00	100.00	7%	1 June and 1 Dec.	85 Sales.
Yokohama United Club	250,000.00	100.00	7%	30 June and 31 Dec.	108 Sales.
C. Nickel and Company, Limited	50,000.00	100.00	8%	1 May and 1 Nov.	110 Sellers.



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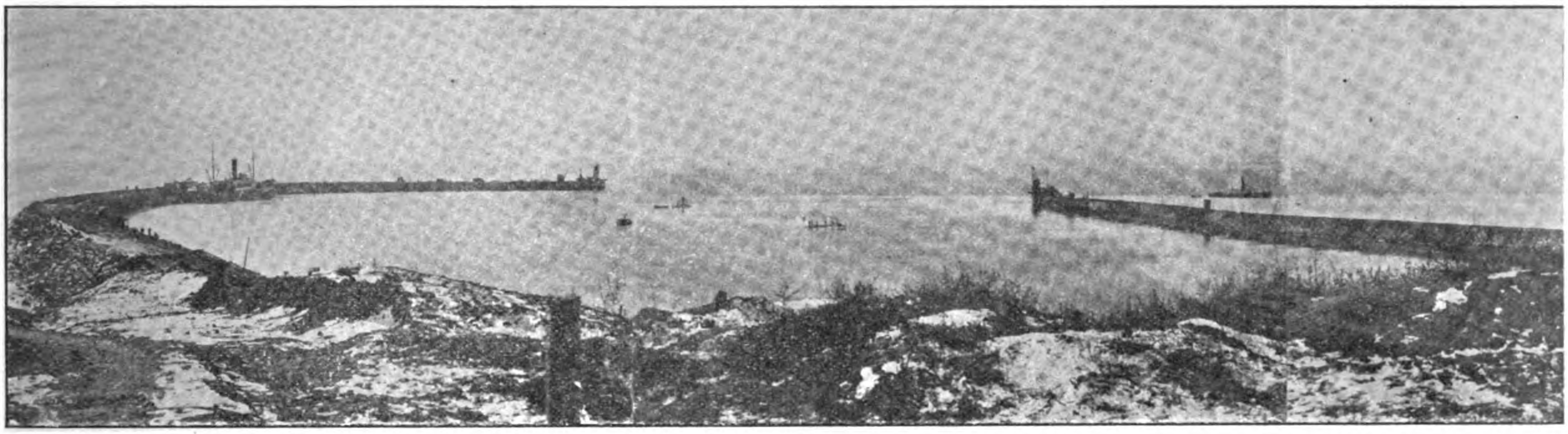
39 PLAZA CERVANTES **TOM ANDERSON** **MANILA, P. I.**

THE FAR EASTERN REVIEW

COMMERCE ✪ ENGINEERING ✪ FINANCE

VOL. II. MANILA, P. I., SHANGHAI, AND YOKOHAMA, MAY, 1906. No. 12.

INDUSTRIES OF THE CHINESE ENGINEERING AND MINING COMPANY, LTD., NORTH CHINA



PORT OF CHINWANGTAO, PROPERTY OF THE CHINESE ENGINEERING AND MINING COMPANY, LTD.—HALF VIEW, COMPLETED IN ILLUSTRATION BELOW

One of the notable and successful enterprises of North China are the industries of The Chinese Engineering and Mining Company, Ltd., the general offices of which are located at Tientsin. The company is composed almost exclusively of British capital, and the controlling interests are held in London. Major W. S. Nathan, R. E., a competent and experienced engineer, is agent and general manager of the company, and at the recent annual meeting of the shareholders the latter paid a high tribute to his conduct of their affairs.

The Chinese Engineering and Mining Company, Ltd., does not confine its operations to coal mining and the manufacture of coke, but also controls the "Tangshan" cement works; has a large firebrick factory; does an extensive shipping business, and executed engineering work in the large and well-equipped shops at Tongshan. In placing the output of the coal mines and the manufactured materials on the market, the company brings into use its canal running from Hsu-ko chwang to Lutai; its private telegraph line between Tientsin and Chinwangtao; its branch railway line from Tangho to Chinwangtao; its steamers —the "Ping" Line—and the port of Chinwangtao, also the property of the company. It will be seen, therefore, that the Chinese Engineering Company, Ltd., besides being one of the largest foreign firms in the East, is singularly complete and self-contained, while the following details will show that the company is quite up-to-date and well abreast of the times:—

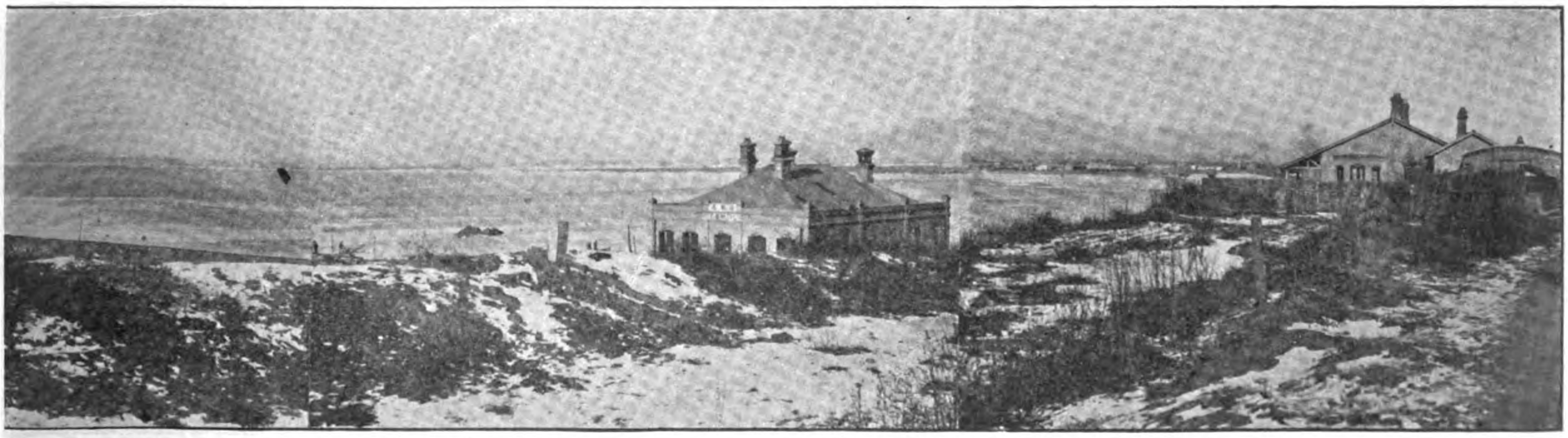
COAL MINES.—The coal mines, situated in the Kaiping District of the Province of Chihli, are extensive and might be said to be inexhaustible. The present output of 3,000 tons per day is unfortunately not nearly sufficient to meet the demands, and the company is pressing forward with all possible speed the erection of the largest electrical plant in the Farthest East, on the completion of which there will be sufficient power to handle up to 8,000 tons per day.

These mines play a very important part in the industrial development of North China, the coal being consumed on all the railways, by the various foreign navies; the Imperial Chinese mints and arsenals, and by practically all the coasting steamers touching at northern ports.

The Chinese are very large users of dust coal not only for domestic purposes but also for brick-burning, bean-oil factories, and distilleries.

COKE MANUFACTURE.—The manufacture of coke is one of the Chinese Engineering and Mining Company's new industries which promises to become a large business in the near future. The coke is manufactured in several grades, the "Special" quality being equal to any produced in Europe and finds a ready market in the government arsenals, mints, and dockyards, where only the best material can be used. When the output of coal will have been increased, following upon the erection of the new electrical plant already referred to, the erection of modern coke kilns will be considered.

(Continued on pages 336-337)



PORT OF CHINWANGTAO, PROPERTY OF THE CHINESE ENGINEERING AND MINING COMPANY, LTD.—HALF VIEW, COMPLETED FROM ILLUSTRATION ABOVE

THE FAR EASTERN REVIEW

GEO. BRONSON REA, M. E.
PUBLISHER AND EDITOR

COMMERCE :: ENGINEERING :: FINANCE

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MANILA, SHANGHAI AND YOKOHAMA, MAY 1906

PUBLISHER'S NOTE

Owing to unexpected demands upon space in this issue of THE FAR EASTERN REVIEW, which were made at the last minute, we are compelled to hold over until next month the concluding installment of the article dealing with the hydroelectric installation in the Province of Mysore, India, by Mr. A. C. Hobble, which has been attracting so much attention from our readers of the electrical engineering profession. The concluding article deals in text and illustrative features with the mines of the Kolar gold fields, and will appear in the June number.

IMPORTANT INDUSTRY PARALYZED

Those who have invested their money in shipbuilding and marine repair plants in the Philippine Islands, find their interests practically paralyzed at the present time on account of a discriminating and wholly unfair and ruinous tariff wall that an all wise congress at Washington has erected around this important industry.

Under existing laws the customs duties on materials and machinery that must be imported to carry on shipbuilding and marine repair work, are from 25 to 33 ⅓ per cent *ad valorem;* and this imposition alone makes it impossible for the local concerns to compete with the foreign shipyards near by for the mmense quantity of work of every description that the maritime interests of the trchipelago are continuously parceling out to ontractors.

These foreign concerns have expert shipbuilders and marine engineers on the ground constantly to pick up the jobs as they develop. These experts have the difference in the high wages for labor paid by the local plants and the cheap labor of the China Coast down to a nicety; they are also familiar with the tariff on all imports into the Philippines, so when a ship is offered for overhauling and repair all they have to do to get the work is to figure off the import duties and the wage excess to a good profit for the firms they represent and they secure the contract. The local firms can not possibly compete with the concerns of the free ports over the way. We do not contend that these foreign firms have no right to invade the Philippine field and secure what business there is to be had, after legitimate and equal competition, but we do hold that as matters now stand the local shipyard and repair concerns are so unfairly discriminated against by the tariff laws that they can not meet more than halfway the competition of the China Coast. The result is that thousands upon thousands of dollars worth of marine work is bundled off to other ports, which, under more favorable conditions, might be kept at home. The local firms say that if some relief were extended to them in the matter of this import tax, they could revive their industry by fair competition, and this is the concession which they are seeking to secure from either congress or the insular government to place their interests on a paying basis.

Another disadvantage which confronts the local firms is the export and import duty on machinery sent out of the Islands for repair and then brought back for delivery. In that case two taxes amounting to from 25 or 30 per cent *ad valorem* must be paid on the machinery, while neither the export nor the import duty is assessed against Philippine registered ships that go abroad for repairs and return with foreign materials and machinery in their composition. Ships alone are exempt from this double tax, and this double-headed discrimination is another dagger that strikes fatally at the heart of the local industry.

Prominent among the local concerns affected by the unfair tariff wall are Messrs. Manuel Earnshaw & Co., Luis R. Yangco, the San Nicolas Iron Works, J. P. Wilson, Juan Rodriguez, Vulcano Iron Works, George Y. Taylor, Sûnico & Co. and El Varadero de Manila, of Manila; Ynchausti & Co., and Messrs. Strachan & MacMurray, of Iloilo, and the Cebu Dock Works, and Manuel Noro, of Cebu. These firms have asked the Philippine Commission for relief, but aside from recommending to Washington congressional modification of the law which would impose upon all Philippine vessels sent abroad for overhauling and repair the export and import tax of the Islands, the commission seems to be powerless to relieve the situation unless by special act it should provide for the refund of all duties paid by the firms on materials imported from abroad. The latter would much prefer the imposition of the export and import tax, which was successfully done during Spanish times. With this protection the local industry prospered and at the same time the government derived a certain revenue which today it is deprived of. Pending congressional action the local interests want the commission to give them a refund of duties assessed against materials and machinery imported, in which event the firms would be in position to compete for the work. They argue that by taking such a step the government would lose absolutely nothing from its revenues because the condition of the industry under the present order of things prohibits these importations and consequently there is no revenue.

We are heartily in accord with the stand taken by the shipbuilding and marine repair concerns. They are entitled to certain concessions that will enable them to meet foreign competition. They have their interests here, pay the industrial and other taxes, and most of their money returns to local circulation. On the other hand the foreign firms pay absolutely no tribute to the government, and all the money spent with them is so much money taken out of local circulation. As we have said before we are not in favor of local monopoly of the business, nor is that what the firms are seeking. We would like them to be in position to compete fairly and honestly for the work, and this object is all they are seeking to accomplish. In its present condition the industry is simply struggling to keep alive. It should be fostered, because with just treatment it could be rebuilt and made a valuable adjunct in the industrial reconstruction of the Islands.

Let the commission give what temporary relief lies in its power, and leave the permanent fostering of the business to congressional wisdom.

LAW OF SELF-PRESERVATION

It appears that, at their recent ordinary general meeting, the shareholders of the engineering and shipbuilding firm of Messrs. Riley, Hargreaves & Co., Ltd., Singapore, stipulated that no account of the proceedings should be published in the papers without receiving the approval of the company. For this reason one Singapore paper refused to make any mention of the meeting other than announce the restriction adopted and its attitude in the premises.

Now, we do not intend to pass judgment upon the paper for the stand it took; but from an impartial point of view we think that Messrs. Riley, Hargreaves & Co. are the best judges of what policy should be pursued in the future interests of their business, and those shareholders who are financially concerned in the enterprise.

We know that in the East it is a custom of long standing for incorporated or registered concerns to give wide publicity to their financial standing, as shown in reports submitted by directors or general managers, as the case may be. However, it is also a fact that there is nothing in law or equity to compel such publicity unless it be in cases where the general public is involved, such as insurance companies, banks, trust companies, etc. We are certain that the shareholders and all the heavy creditors of Messrs. Riley, Hargreaves & Co.—if there be any of the latter—are fully informed of the exact standing of the firm, and the condition of its business, and this being the case we believe that the company had a perfect right to safeguard its internal affairs against public distortion and mutilation, if, by so doing, the best interests of the enterprise would be subserved. Our confidence in the good judgment of Messrs. Riley, Hargreaves & Co. leads us to the opinion that the restriction complained of was perfectly regular and strictly within the bounds of good business methods.

If other companies with an organization similar to that of Messrs. Riley, Hargreaves & Co. choose to publish the details of their business to the world, that is their privilege. On the other hand, if any or all of them should decide that their internal affairs are no affair of a disinterested public they have just as much right to withhold these same details from the public. And we believe that many other Far Eastern companies would be doing themselves and their shareholders better service if they should adopt a policy similar to that Messrs. Riley, Hargreaves & Co. saw fit to adopt on this occasion.

DEATH OF MR. ROBERT W. LITTLE

It is with profound regret that we are called upon to note the recent death of Mr. Robert W. Little, for many years editor of *The North China Daily News* and one of the best known and most highly respected journalists of the Orient. During his long and exceedingly brilliant career of newspaper work Mr. Little rendered invaluable service to the Settlement of Shanghai, where his death is probably more keenly felt than anywhere else. Shanghai and its interests were always foremost in the edit-

or's thoughts and probably no other resident of that city did more to promote the city than did Mr. Little. Her industries, her commerce, and her public works, could always rely upon his personal influence and that of the great paper he conducted so ably. We are told that it was while Mr. Little was chairman of the Legislative Council of Shanghai that he saved the magnificent Bund from the spoliation of wharves and godowns, thus preserving for the public the most attractive thoroughfare of the settlement. "It was during his chairmanship of the council (I think in 1879)," writes one of his admirers, "that one or two Bund lot-holders began to utilize their frontage to lay vesssels alongside the then privately-owned jetties,—a legitimate action to which the council had neither the power nor the right to object. But so keenly did he feel the possibilities of the then mud foreshore, and so great was his personal influence, that he succeeded in persuading the then Bund lot-holders to allow the council, as a tentative measure, to fill in the exposed mud flat and turf it over. As I remember this was a provisional arrangement with each individual land renter, who did not thereby abandon his claim to the foreshore; and so, by not disputing these claims, the grand improvement was quietly and promptly carried out; and, so far as I know, the ownership of the foreshore is an open question to this day. Only those who remember Shanghai with its modest roadway —the old junk towpath widened—and the nauseous mud flat outside the compound walls of the *hongs* of that day can appreciate the boon that the then chairman conferred upon posterity." Mr. Little was essentially a cosmopolitan. His paper, under his editorial direction, was an every-day helpmate of all the nationalities that made this unique British settlement. Worthy enterprises were always welcomed by him, no matter by whom promoted; and while Mr. Little never showed partiality towards American interests that invaded the field the American community came to regard him as its particular friend and helpmate. To the Americans of Shanghai Mr. Little's death is a severe blow. In the paper he so ably conducted Mr. Little leaves a lasting monument to his memory—its upbuilding was the crowning feature of his life work.

MANCAYAN-SUYOC MINERAL SURVEY

One of the most interesting and difficult mineral surveys attempted in the Philippine Islands since American occupation, was recently successfully carried out by Mr. A. J. Eveland, M. E., a government geologist, then connected with the Mining Bureau and at the present an assistant on the staff of the Mining Division of the Bureau of Science. Mr. Eveland calls his survey a preliminary reconnoissance of the Mancayan-Suyoc mineral region of Lepanto, located in Northern Luzon, and in a very thoughtful and complete bulletin he furnishes valuable facts and data concerning the country traversed, which ought to be read by every miner who chances to come across the document. He has gone into the subject so intelligently and so conservatively that the statements made can not help but leave a favorable impression of the value of the duty he has performed for the government. In this issue THE REVIEW begins the publication of the document, which will extend over a period of at least 3 mos. Too much credit can not be given to Mr. Eveland for the faithful work he has performed; on the whole we consider his report one of the most able expositions of the mineral possibilities of Northern Luzon that has yet been compiled.

For a mining district which has been under exploitation 4 or 5 yrs., the Mancayan-Suyoc area has surprisingly little development. Much of this lack of progress is due to natural conditions which prevail, but to some extent at least there is or has been a lack of initiative to put forth real effort. Assessment work has been done *as* assessment work, in disconnected pits and tunnels in the softest material that could be found, instead of combining each year's labor with that of the preceding to attain needed information. The net result is that the area presents an unsatisfactory aspect to the engineer who wishes to ascertain facts. Natural conditions in the Philippine Islands are invariably arrayed against the miner, the engineer, and the geologist; and when such conditions have to be faced, and in addition there is a dearth of developed information, but little may be had to aid the judgment. It does by no means follow that a fine showing of a prospect indicates a fine future, and conversely that a poor prospect is doomed to failure. Rarely does it occur that on an area so little developed as this enough data can be found to venture an authoritative opinion, and it is a fortunate state of affairs when condemnation or approval may be urged without reservation. While a natural allowance must be made for an enthusiastic spirit, there is still a great deal of truth in the current belief of the miners that this area "shows better surface indications" than any region of their experience. There is no doubt that, considered solely as "prospects," the greater proportion of the staked-out claims are well worth considering.

Of vital importance to the future prosperity of this region is the solution of several difficult problems. Provided more ore bodies of sufficient size and value are found, operators are faced with no small trouble of labor and transportation, with their directly depending questions of cost, profit, and treatment.

The labor problem in the Philippine Islands is one that up to date has not proven an insurmountable obstacle, but the location of this region adds a new phase to the problem which heretofore has not been considered. Throughout the Philippines as a whole it is the general consensus of opinion that Filipino labor can profitably be used when proper treatment and supervision are employed.

On the road work in a large proportion of the provinces Filipinos of various races have been employed, and with a single exception reports have been very satisfactory. Mr. N. M. Holmes, after 3 yrs. of observation, as chief engineer of the Benguet Road, condemned the Filipino laborer from every point of view. It is believed, however, that there were factors in that period which no longer have to be considered, as during the completion of the same enterprise, under the supervision of Major L. W. V. Kennon, U. S. Army, as chief engineer, reports as to the native labor employed were decidedly favorable.

The Atlantic, Gulf and Pacific Company, using up to 1,000 men, have, according to the report of Mr. H. Krusi, the vice-president, met with unqualified success. The Cavite Navy-Yard, also using large numbers of Filipino laborers, has, according to the report of Captain Couden, U. S. Navy, been equally successful in meeting the problem. The Manila Electric Railway and Lighting Company, in its construction and operation of about 60 kilometers of line, have used Filipinos from the start with like success. In all these works effort has been made to provide for the wants of the Filipino, to make life as comfortable as possible under the conditions, and to learn and apply the proper supervision.

Of more pertinence to this report is the unqualified statement of all at present engaged in mining operations that Filipino labor not only may be endured but that it bears comparisons with other races. In Benguet, Masbate, Camarines, and other districts Filipinos are being used; in other districts native labor has been employed in the past, and all with good results. The keynote seems to be successful and competent supervision, with as much careful study of native characteristics as would be given to any other little-known problem.

That the *proper* use of native labor reduces considerably the costs involved can not be denied, and this factor can not be neglected.

As has been stated previously, however, the problem in Lepanto has conditions peculiar to itself, which should be carefully considered. It may be said in the beginning that dependable labor, certain in supply and quality, can not be obtained locally. There is, it is true, a large population, most of them used to labor, to draw upon for limited or occasional demands, but that local supply will meet the demand of extensive mining operations, steadily and with the requisite intelligence, seems extremely doubtful, at least. This applies to the regular forms of more or less skilled labor which mining operations depend upon for their very existence.

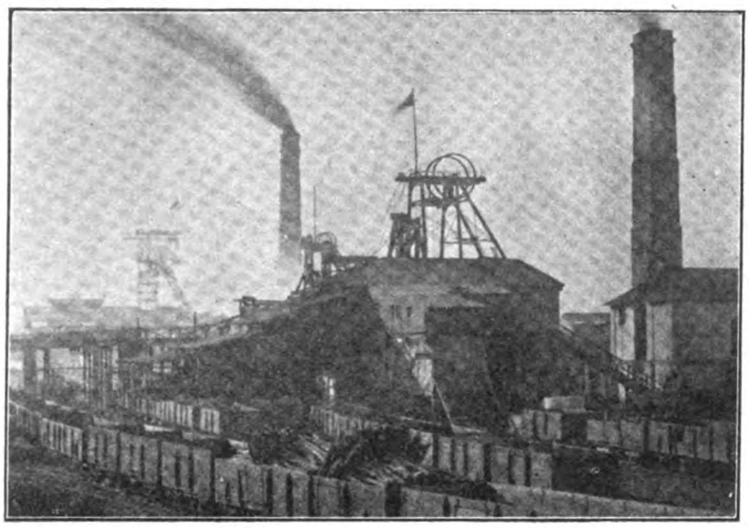
Transportation at present, with but slight exception in the way of native porters or *cargadores*, may be marked *nil*. Transport in both directions, supplies in and product out, must be considered. The present lines of travel are horse and foot trails, and the distance to the coast (about 40 ms.) makes packing excessively expensive. Direct railroad projects seem unfeasible, and a railroad down the Abra Valley, with its terminus at Vigan, has been considered as questionable. The nearest light in that direction would seem to be an examination of the route between Lepanto and the capital of Benguet Province to the S., Baguio. There has been completed a wagon road from the northern terminus of the railroad, Dagupan, to Baguio, and the railroad continuation, probably under electric motive power, is under consideration. Mancayan and Baguio are about on the same level at an altitude of 5,000′, and the existence of a route along the mountain ridge between the two is very probable. It is expected that the present field work of the Mining Division will throw light on this suggestion, and at all events the question of routes and costs can not be abandoned so lightly. It will take careful examination of known routes, and equally careful search over newer routes, before assurance may be had as to either result. It is not believed, however, that the difficulty is insurmountable.

The solution of these two most important problems will practically eliminate the remaining obstacles. There is in the district water in sufficient quantities for considerable power, and by transmission from a small distance the whole power of the Abra River may be utilized, in a combination of hydraulic and electric methods.

It is doubtful if steam could be furnished at the mines for any considerable amount of call upon it. Former smelting operations and lack of preservation have removed the timber from the whole valley of the Abra, and while it is believed that plenty of wood fuel is within a reasonable distance, it would take careful calculation before any design of power plants could be considered.

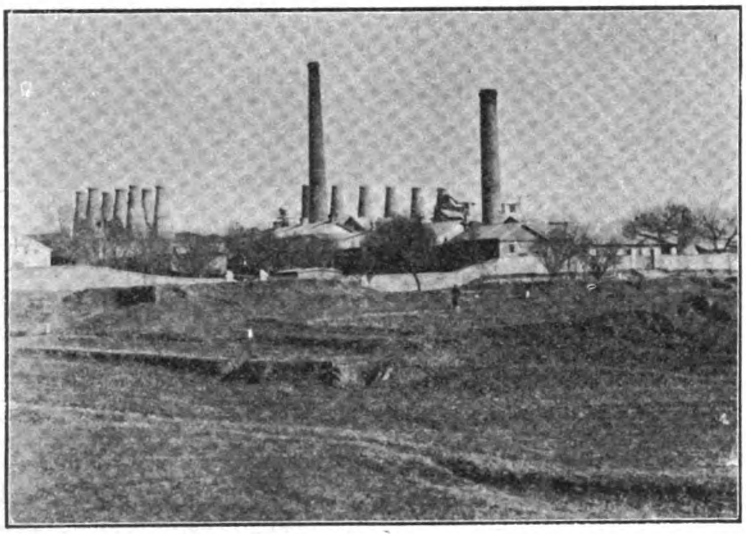
We have, then, the consideration of a district whose prospects certainly appear of a favorable nature. There are numerous obstacles to be overcome, but all of them, it is believed, may be handled if the one vital problem, of the presence of the ore, is settled. Given the ore, large and valuable enough, and the remainder of the problem becomes one of adaptation and engineering.

The old Mancayan mine was, without doubt, an extraordinarily rich deposit, and the quantity of ore still remaining is worthy of examination. The ore dump, of huge size, contains ore that was then discarded, but under new conditions represents in itself a small mine of fair grade. The old smelter sites and slag dumps are rich with such material as slags containing as high as 32 per cent of copper, and further underground work may reveal more ore bodies. So far as the work already done goes, much may be hoped for the rest of the district—everything depends upon further exploration. In many cases mining properties may be condemned very quickly by an examination, but the Mancayan-Suyoc area is far from being one of these. While positive assurances of a future are lacking, no efforts should be spared, and no amount of skilled exploration neglected to ascertain more; the district is decidedly not to be classed as of little value, and within a short time, under the scheme of exploitation planned, an ore-producing district of considerable magnitude and richness may not be unlooked for.

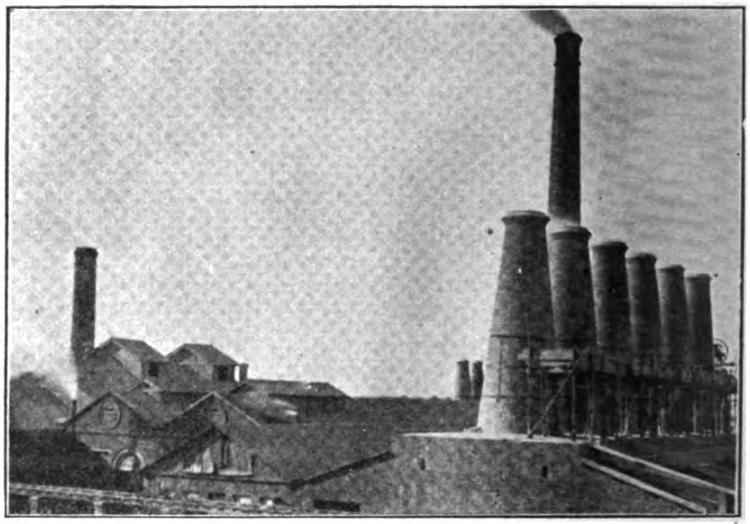


TONGSHAN COAL MINES

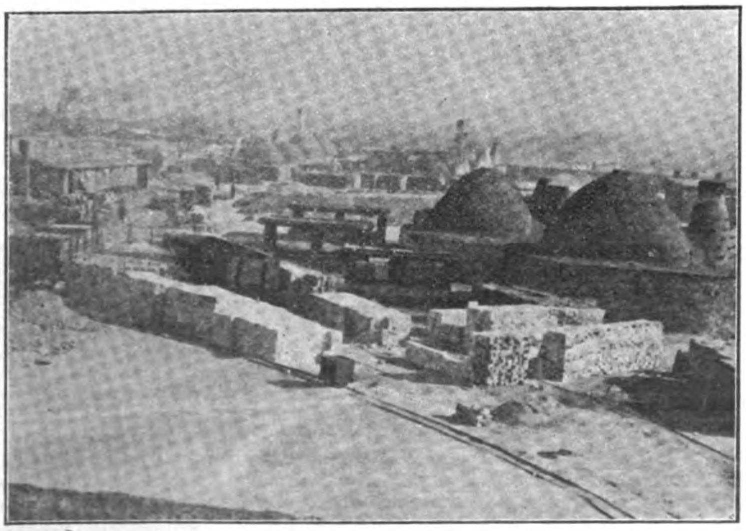
ANOTHER VIEW OF THE TONGSHAN COAL MINES



"TONGSHAN" CEMENT WORKS



ANOTHER VIEW OF THE "TONGSHAN" CEMENT WORKS



FIREBRICK FACTORY

COKE MANUFACTURE

INDUSTRIES OF THE CHINESE ENGINEERING AND MINING COMPANY, LTD., NORTH CHINA

(Concluded from page 333)

ENGINEERING.—The company has reorganized and extended its workshops at Tongshan, including the installation of a modern and efficient plant for turning out all kinds of iron work, machinery and repairs in an expeditious and workman-like manner. The workshops are under the constant supervision of experienced European engineers. A large stock of all classes of material from the best makers is kept at Tongshan under the superintendence of a foreign storekeeper.

MINING REPORTS AND ASSAYS.—At its fully-equipped laboratory at the mines the company is prepared to give reliable assays and to undertake analytical work. The company will also undertake to survey and report upon mining concessions in the Province of Chihli, and to carry out borings and other preliminary investigations.

CEMENT WORKS.—The company controls the "Tangshan" cement works—the first cement factory erected in Chinese territory—where is manufactured the well-known "Tangshan" brand of cement. This factory is situated amidst the limestone hills N. of Tong colliery where limestone and clay are found in abundance and of unusually good quality. The minute control given to the manufacture by European cement experts, resulting in evenness of quality, has brought this brand of cement into prominence to such an extent that the output is not nearly sufficient to cover the larger demand and the question of increasing the plant is now under consideration. It should be noted that the cement has always secured gold and silver medals whenever it has been placed on exhibition.

The cement works also manufacture numerous by-products, the most important being flooring tiles in cement and clay. As a new industry in the East the manufacture of the cement flooring tiles—called cement mosaic tiles—is worthy of special attention. The base of these tiles is of concrete, the face of a mixture of fast colors and cement worked into any of the large assortment of designs in stock.

FIREBRICK FACTORY.—From the time when the coal mines were placed under European management there has been a considerable demand for firebricks for lining the several shafts and as supports underground, and the firebrick factory has up to quite recent times met only this demand. The excellent quality of the fire clay and the practically unlimited supply of that material have induced the company to place its firebricks in the Eastern market with very agreeable results. From a few thousand bricks, the output has increased to 2,000,000 per month. Unfortunately for the company, the demand is not nearly met and the general impetus to all local industries following in the wake of the extension of railways, the erection of mints and other public works has made it imperative that the factory should be considerably extended. These extensions are now being pressed forward as rapidly as possible. It is no exaggeration to say that these firebricks are unequalled in the Far East, while it is held in some quarter that they are superior to the best Scotch firebricks. A considerable business is also done in fireclay pipes, boiler sealing blocks, free covers and special bricks of all shapes and sizes.

SHIPPING.—The company possesses a fleet of steamers specially suited for the coast trade of China. These vessels are fitted with first-class accommodation for passengers, and the larger ships are fitted with electric light.

A considerable export trade in coal, firebricks, cement and general cargo is done with Newchwang, Chefoo, Weihaiwei, Tsingtau, Shanghai, Hankow, Hongkong, Canton, and other ports. The import trade, consisting mainly of piecegoods and general cargo, comes principally from Shanghai, but a good trade is also done with the abovementioned ports.

The company has its own wharves and godowns at Tientsin, Chinwangtao, Tongku, Shanghai, and Canton, and also godowns and property storage of cargo at Newchwang and Chefoo.

The shortest sea route between Tientsin and Shanghai is *via* Chingwangtao. The company's steamers leave Chinwangtao for Shanghai on the arrival of the mail trains from Peking and Tientsin, and incoming steamers are timed to connect with the morning mail train.

The company's new steamer, *Kaiping*, offers the most comfortable, rapid and sure means of communication between Shanghai and Tientsin or Peking. The journey occupies about 60 hrs. and is independent of the uncertainty and delay, due to the bar, attaching to the Tongku route.

LUTAI CANAL.—This canal, from Hsu-ko-chwang to Lutai, a distance of 15 ms., connects with all the waterways of China.

PORT OF CHINWANGTAO.—Chinwangtao is an ice-free port in the Gulf of Pechihli, situated approximately lat. 39° 55′ N., Long. 119° 38′ E. The Chinese Engineering and Mining Company, Ltd., owns the land in the vicinity of the port, and has constructed a breakwater and pier for the accommodation of shipping. At present six berths are available, the approximate depths of water being as follows:—

	Low Water.	High Water
Alongside pier (length 300′)	16′	21′
Alongside breakwater (length 1300′)	20′	25′
	13′	23′
	17′	22′
	16′	21′
	14′	19′

Dredging operations are in progress with a view to increase the depth to 25′ alongside berths. There is good sheltered anchorage in The Roads.

The company's branch line to Tongho Junction connects the pier and breakwater with the main trunk line of the Imperial Railways of North China (Peking to Newchang) and trains from the harbor are run to connect with all mail trains. Cargo is loaded direct from the ship's holds on to cars and *vice versa*, so that a minimum of handling and consequent freedom from loss and damage are ensured.

Chinwangtao is the natural distributing centre for the Northwest part of the great Province of Chihli. The facilities, resulting from the company's liberal expenditure of capital, for the rapid and economical handling of cargo, have caused Chinwangtao to become also a formidable rival for the trade hitherto shipped through Tongku for Tientsin. A considerable portion of this trade throughout the year now passes through Chinwangtao, whilst during three months of winter, when the Pei-ho River is closed to navigation, the whole trade of Tientsin is carried on without interruption through this channel.

Godown accommodation and covered storage are obtainable.

The facilities for quick despatch may be gauged from the fact that a steamer was recently loaded with 2400 tons of coal in 13 hrs. There are three steam cranes to lift up to five tons, and arrangements can be made to lift weights of 15 tons. The expense, delay, and damage entailed by the lighterage of steamers which must be encountered at Taku Bar are here entirely obviated.

The great increase of trade year by year has induced the Imperial Maritime Customs to specially erect a fine custom house with a deputy commissioner in charge, and to open a Haikwan Bank for the convenience of local consignees.

The natural geographical advantages of Chinwangtao caused it to be selected as the port of embarkation for the emigration of coolies to South Africa, and during 1904 an extensive depot was established, where the coolies are received, medically examined and lodged before embarkation on the fine transports specially engaged in this business.

As a seaside health resort Chinwangtao is unrivalled by any other place in China. Situated midway between Shan hai-kwan and Pei-tai-ho, its easy access from all parts, dry and bracing climate, safe bathing from a beautiful sandy beach, and its magnificent views of sea and mountain ranges are but a few of the most salient attractions which impress a visitor to this delightful summer resort.

HOTEL.—There is a good hotel close to the piers and beach, where under competent European management every comfort and attention are ensured. The growing influx of visitors has induced the company to turn its attention to the erection of an up-to-date hotel, in which every modern improvement is introduced, and which will shortly be completed.

That portion of the property known as The Bluff, and comprising the best residential and business sites, has now been laid out as a township, and plots may be bought or leased on moderate terms.

The company's telegraph line between Tientsin and Chinwangtao places the latter port in telegraphic communication with all parts of the world.

FEDERATED MALAY STATES RAILWAYS

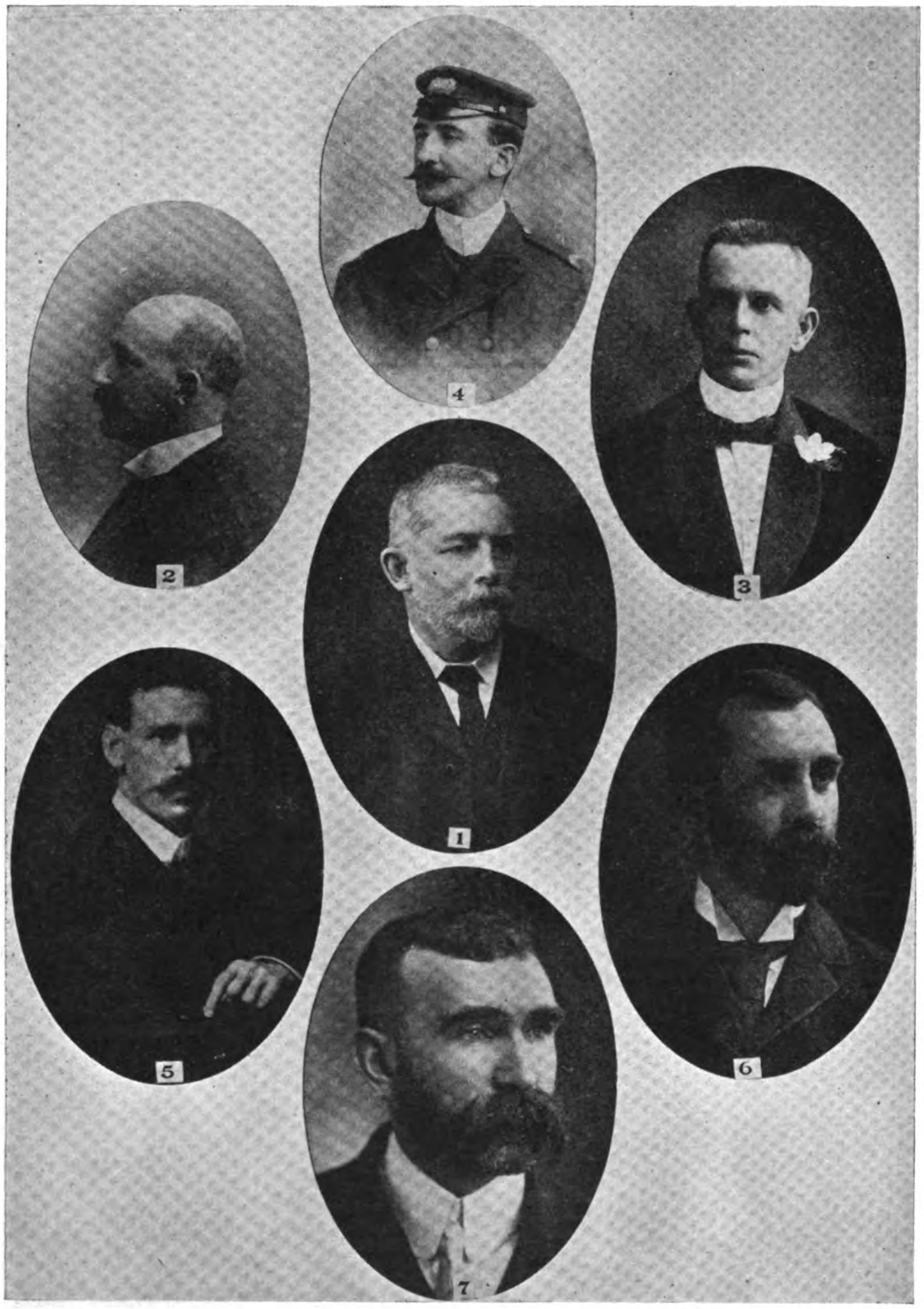
Here is what a resident of Ceylon has to say about the railways of the Federated Malay States, after completing a tour of the lines:—

The trains on the Federated Malay States railway system, metre gauge, are punctual to a fault. Accustomed to a minute's grace in Ceylon I missed the second train I attempted to catch—at Simpang station on a branch line in Perak. Admittedly there are no complications save at one place, dignified by the name of the "pass," where sliding earth exists like the Haputale slope, though with no impressive scenic surroundings to hold the traveler. A rule is said to exist, as in Ceylon, against drivers attempting to make up lost time; but a little reasonable latitude, though rarely needed, is evidently allowed.

The trains run smoothly, too, but over many bridges they rattle as though the heavens above had opened and innumerable dollars were crashing down. On some of the branch lines the trains run the same on Sundays as on week days. The appointments at the chief stations eclipse in cleanliness and sanitation anything to be found in Ceylon; and "smoked" windows for lavatories in the train is an idea worth copying. Children are conveyed to and from school free. The schoolmasters give out the tickets and each boy receives two singles—one to take him home and the other to bring him back. Neat little pocket time-tables are prepared by the department and are circulated free—they are not distributed broadcast, but they can be obtained; and they also have useful informations about the coasting steamers, etc.

Another wrinkle, for improved lighting, is the placing of four mirrors at an angle of 45 degrees round the lights in the compartments—the provision is there, though it has to be little used—enabling one to read comfortably by oil lamp. Corridor trains are run on the true Western principle, and a traveler can, if pressed for time, pay the ticket collector *en route*. Many Jaffna Tamils are employed on the railway in various capacities; but the occasional Chinese stationmaster, in his neat white uniform and white-covered straw hat, arrests the visitor's attention most of all. No return tickets are issued; they were abolished when a reduction of fares took place.

FOUNDATION AND GROWTH OF THE INSTITUTION OF ENGINEERS AND SHIPBUILDERS OF HONGKONG



OFFICERS OF THE INSTITUTION OF ENGINEERS AND SHIBUILDERS OF HONGKONG—*(1)* MR. H. T. RICHARDSON, R. N. R., PRESIDENT—*(2)* MR. E. O. MURPHY, VICE-PRESIDENT—*(3)* MR. JOHN LAMBERT, R. N. R., 2D VICE-PRESIDENT—*(4)* MR. W. A. CRAKE, CHAIRMAN OF COMMITTEE ON MANAGEMENT—*(5)* MR. T. W. ROBERTSON, VICE-CHAIRMAN OF COMMITTEE ON MANAGEMENT—*(6)* MR. V. WATSON, HONORARY TREASURER—*(7)* MR. D. J. LENNOX, SECRETARY AND MANAGER

Among the many unique and highly important professional organizations throughout the Far East, which are international in character, one of the foremost in prominence and influence is The Institution of Engineers and Shipbuilders of Hongkong.

The Institution was organized in the year 1891, when, in the month of January, about 80 of the most prominent engineers and shipbuilders of the colony assembled and drew up a set of rules and by-laws for the management of the organization. Since the date of its incorporation as a limited company, in the month of April of the same year, The Institution has continued to advance, with the result that after a life of 15 yrs. it is at the present one of the most powerful and influential organizations in the Orient. The present position of The Institution has, it must be acknowledged, been obtained only by the loyal support of the members, and the time ungrudgingly given by a number of busy resident members, elected annually, to manage its affairs.

Home of The Institution.—From the time of its birth until it was several years old the membership of The Institution steadily increased, when, in the year 1899, larger and more commodious premises had to be found. These are the ones at the present occupied by The Institution at No. 4, Des Voeux-rd, adjoining the N. end of the Hongkong and Shanghai Bank. The house was opened with great *eclat* by the governor, Sir Henry A. Blake, and a distinguished company of the leading people of the colony.

The suite, of which the members are very proud, consists of seven rooms, including the secretary's office. The billiard room, one of the finest in the colony, measures 27×58′, and contains three first-class English billiard tables, on which are played many exciting games in competition for valuable cups and other prizes presented by the prominent members of The Institution. Hung on the walls of this room are portraits of eminent engineers and shipbuilders; of past presidents and vice-presidents of The Institution; and a great number of handsome models of every variety of the naval architect's genius—from a small launch to a large modern ocean passenger steamer.

The reading room, which is large and airy and well appointed, is stocked with the best weekly and monthly technical and illustrated papers, and contains a large library of standard scientific and engineering books. Specimens of various sections of iron and steel, twisted and bent cold into all shapes, are exhibited in a glass case. There are also in this room rows of pigeon-holes in which the members' correspondence is deposited.

A tastefully furnished room adjoining the reading room and opening on to a verandah, is set apart for ladies. This room is greatly appreciated by the wives and daughters of members, who, when out shopping, adjourn to it for afternoon tea and other light refreshments.

There is also, what is considered a necessary adjunct to an institution geographically situated as this one is, a comfortable bar-room, in which every variety of liquid refreshment may be obtained.

In an exceptionally broad corridor, extending the whole length of the building, are exhibited on the walls models of all the best-known slide-valve motion gear; and large boards, on which are the names of all the members and the occupation they follow.

One of the two remaining large rooms is nsed for carrying on technical classes, and holding meetings, and the other is reserved for the use of the manager.

Extending the whole breadth of the building is an excellent verandah, which is considered to be one of the coolest spots in summer of any of the lower levels of the colony.

The area covered by this admirable suite of rooms, including the verandah, is 4,460 sq. ft. Were the present membership to be increased two-fold there would still be ample accommodation.

Technical and Social Features.—During the winter season technical papers are read at meetings, and smoking concerts and other entertainments are given. For these latter purposes the billiard room is easily adapted and made to represent a miniature theater. One of the most successful balls of the season given in the colony, attended always by more than 700 people, is held every year in the city hall under the auspices of The Institution.

The members enjoy many privileges through being connected with The Institution, from which they otherwise would be debarred, except at greatly increased cost. Amongst these are cheaper refreshments, billiards, easy access to the best literature, the latest Reuter's telegrams, the local newspapers, and the

HOME OF THE INSTITUTION

delivery free of cost of all correspondence and parcels addressed to care of The Institution to members in any part of the colony or to ships in any part of the harbor.

OFFICERS AND MEMBERSHIP.—The present membership of The Institution is composed of 183 ordinary, 30 associate, 60 visiting *A*, 16 visiting *B*, and one honorary member. Of the ordinary members nearly one-half are engineers and shipbuilders employed on shore, and the remainder, including the visiting members, and nearly all the associates, are sea-going. A new departure was made in the constitution of The Institution in the year 1904, when it was decided to admit masters and mates of the merchant marine. Several of these gentlemen have joined as associate members. Although the number of members is not below the normal, still, considering the great number who are eligible, trading out of the port, it is disappointing that more do not appreciate the benefits to be derived from the organization and become members.

The Institution has had for its presidents some of the most prominent local gentlemen of the profession. Mr. D. Gillies, the popular and distinguished chief manager of the Hongkong and Whampoa Dock Company, Ltd., was president from its inception till the year 1900, when he retired. In 1901 Mr. R. Cooke, manager of the Kowloon docks, was elected, but during the year was carried off by death. Each year since 1901 the office was filled respectively by Mr. W. Ramsay, superintendent of the China Navigation Company; Mr. Donald Macdonald, consulting engineer; Mr. W. C. Jack, consulting engineer; Mr. N. Mumford, surveyor to Lloyd's Register; and this year the office is filled by Mr. H. T. Richardson, R. N. R., marine and engineer superintendent of the Canadian Pacific Railway Company's R. M. steamers.

The vice-presidents for the current year are Mr. J. Lambert, R. N. R., surveyor to Lloyd's Register, and Mr. E. O. Murphy of the firm of Messrs. Bailey & Murphy, engineers and shipbuilders.

The chairman and vice-chairman of the committee of management are respectively Mr. Mr. W. A. Crake, government assistant marine and engineer surveyor, and Mr. T. W. Robertson, superintendent of the Star Ferry Company and the Kowloon Wharf and Godown Company.

Mr. V. Watson, Public Works Department, is honorary treasurer, and Mr. D. J. Lennox performs the combined duties of secretary and manager.

TIENTSIN'S FUTURE PROSPECTS

In his annual address to the Tientsin General Chamber of Commerce, Chairman J. M. Dickinson said:—

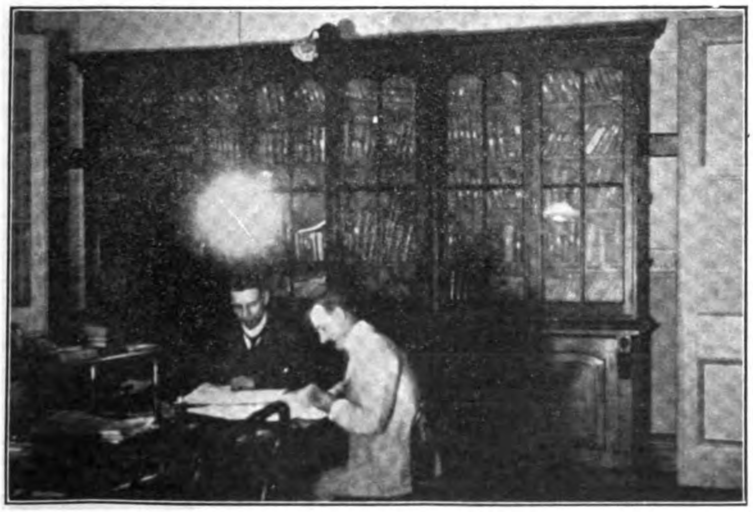
"It is needless for me to remind you that Tientsin is practically the only port for some 60,000,000 or more people, including the whole of Chilhi, part of Sanshi, Shantung Kansu, and Mongolia, to say nothing of the vast field for enterprise in Manchuria. Railways and mines are springing up in all directions, the people are, apparently, quiet and prospering, and with good native administration we have every encouragement to look hopefully forward to the future."

The chamber's policy with regard to Taku Bar was expressed in the following resolution:—

"It is resolved that this chamber accepts the additions and modifications of the resolution passed June 15th last, and further instructs the committee to urge upon the authorities concerned the necessity of prompt attention to be given to the amelioration of Taku Bar."

KING OF SIAM'S DAIMLER CAR

Says *Motor*:—This truly regal car has just been supplied to His Majesty the King of Siam. The chassis was directly ordered from the Daimler Motor Co. (1904, Ltd.), whilst the body was specially designed and constructed by the Lacre Motor Car Co., Ltd. It is a magnificent specimen of the carriage builders' art, seating three passengers on the rear seat, two in revolving armchairs, and two on the front seat. The body is painted a royal red, picked out with black and lined with orange. The upholstering exactly matches the color of the body. The canopy is covered on the top with white waterproof material and lined inside with a dark red shade. There are three glass screens, each of which can be slid up into the roof, the panels all being bevelled and surrounded with walnut framing, with inserts of satin wood. Side curtains with celluloid panels completely enclose the rear portion, and a handsome Turkey carpet covers the floor. A folding luggage grid is fitted to the rear, and arrangements are made for carrying space tyres on the roof. The wheel-base is 11 ft. This huge vehicle was on Thursday night packed into one of the largest tin-lined packing cases ever constructed for such a purpose, and is now on its way to its Royal owner.



THE READING ROOM

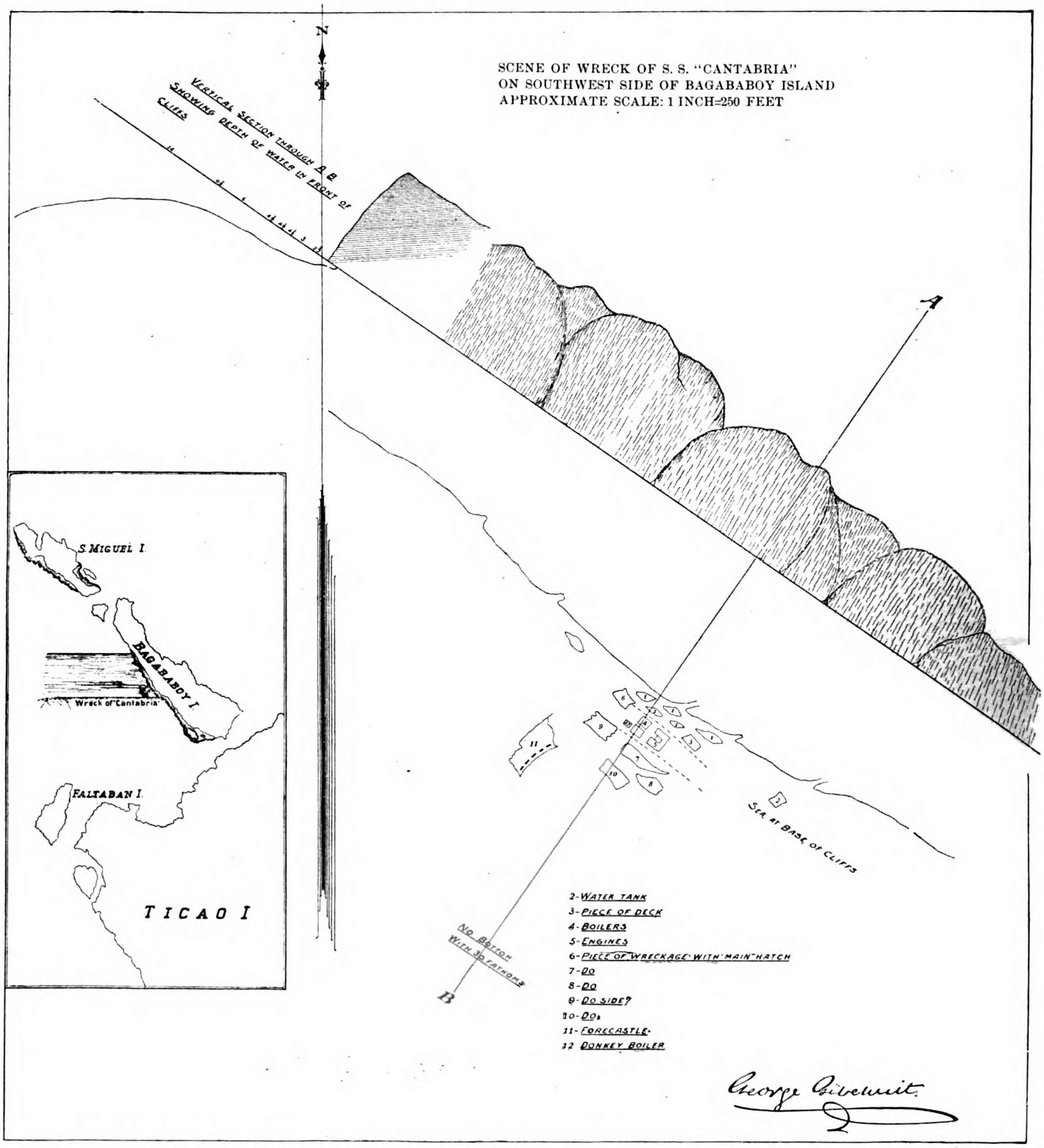
BUFFET OF THE INSTITUTION

STUDY OF THE VERY GREAT IMPORTANCE OF THE SEA SWELL AS RELIABLE SIGN OF A CYCLONE

The terrible storm which swept over the Philippine Islands from the N. of Samar to Mariveles last September 22d-28th, in a belt more than 100 ms. wide, is treated from a meteorological standpoint in a bulletin just issued from the Manila Central Observatory, and that part of the report dealing with the action of the sea, with particular reference to the destruction of certain shipping, doubtless will prove of great interest to all mariners and others whose business brings them in relation with Far Eastern shipping. The Rev. Father Miguel Saderra Mata, S. J., assistant director of the Weather Bureau, who compiled the data and statistics pertaining to this feature of the storm, calls it the "Cantabria" cyclone instead of speaking of the cyclone as having occurred on a certain date, because the principal facts did not take place on one and the same day. He explains that he might have taken the name "Leyte," but this might in the future cause some confusion with the cyclone known as "Baguio de Samar y Leyte." Moreover, Father Mata, who was honored, as he writes it, with the friendship of the unfortunate Captain D. Bernardino Madariaga of the ill-fated steamer *Cantabria*, takes this opportunity of paying respect to his memory by calling the cyclone by the name of the ship in which the captain lost his life.

DIRECTION AND EFFECTS OF CYCLONIC SWELL.—We wish to impress well on the minds of seamen especially, says Father Mata, who, by reason of the circumstances of their calling, may often find themselves reduced to their own observations to fight a coming storm, the very great importance of the sea swell as a sign of a cyclone.

If we were asked to explain how we conceive the origin of this swell, we should say that we picture it as a gigantic artesian well-spout running along the path of the storm center, and so long as the center is over the sea, pours out tons and tons of water in all directions; these great billows, coming fast on one another, crowd together and form those mountainous masses of water which bear down without mercy on the stoutest ship and try the skill



Drawing by Mr. George Gilchrist, Manila.

SCENE OF THE WRECK OF THE STEAMSHIP *CANTABRIA*

of the ablest and bravest masters. We may also imagine the currents of the sea as being analogous in their motion to those of the air; namely, the lower converging towards the center, the upper or surface currents emerging; and thus, as it is in the region of the cirrus that we find the first indications of a cyclone, so also in the currents of the sea we have forerunners of a storm center.

We do not hesitate to say that the present cyclone presents us with one of the best instances of the usefulness of this sign, showing at the same time a perfect distinction between the *swell* and the *wave* proper of the vortex. The coast towns of Sorsogon, especially on the E., furnish the evidence, the valuable notes of Señor José Magno, which are as follows, being particularly to the point. He says:—

"Already on the morning of the 25th there was *considerable swell*; there was scarcely any wind, yet the sea sank a parao off the coast here.

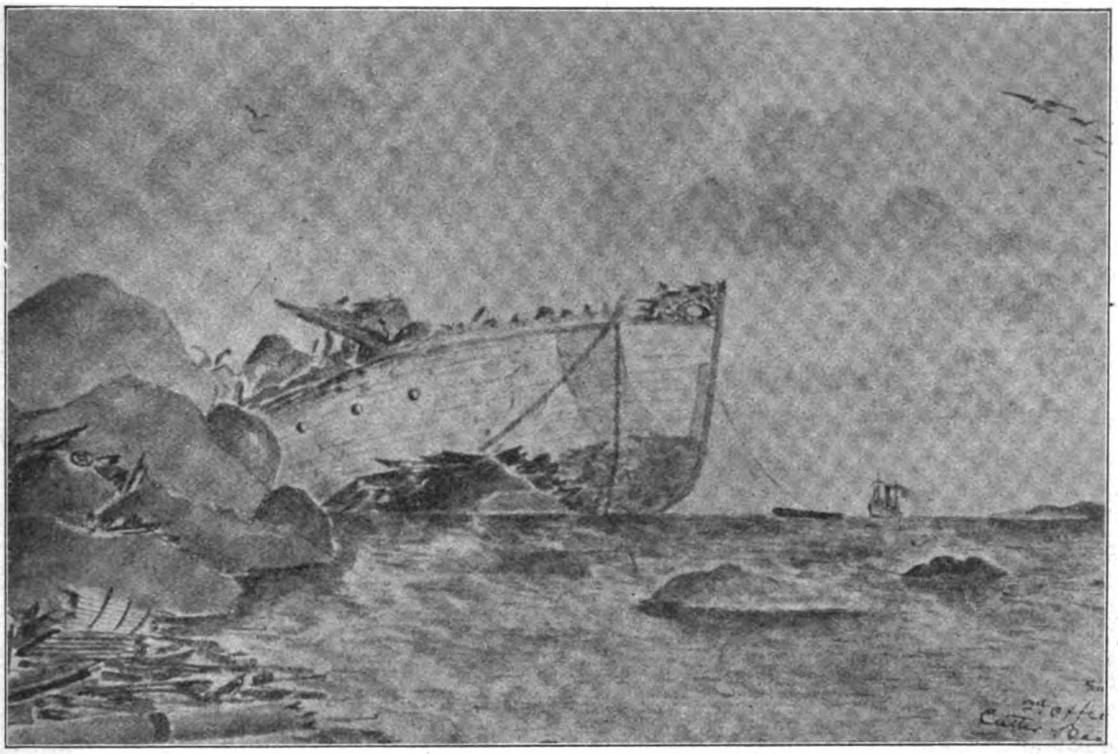
"The afternoon was so fine that I did not think of looking at the barometer until 10 p m.

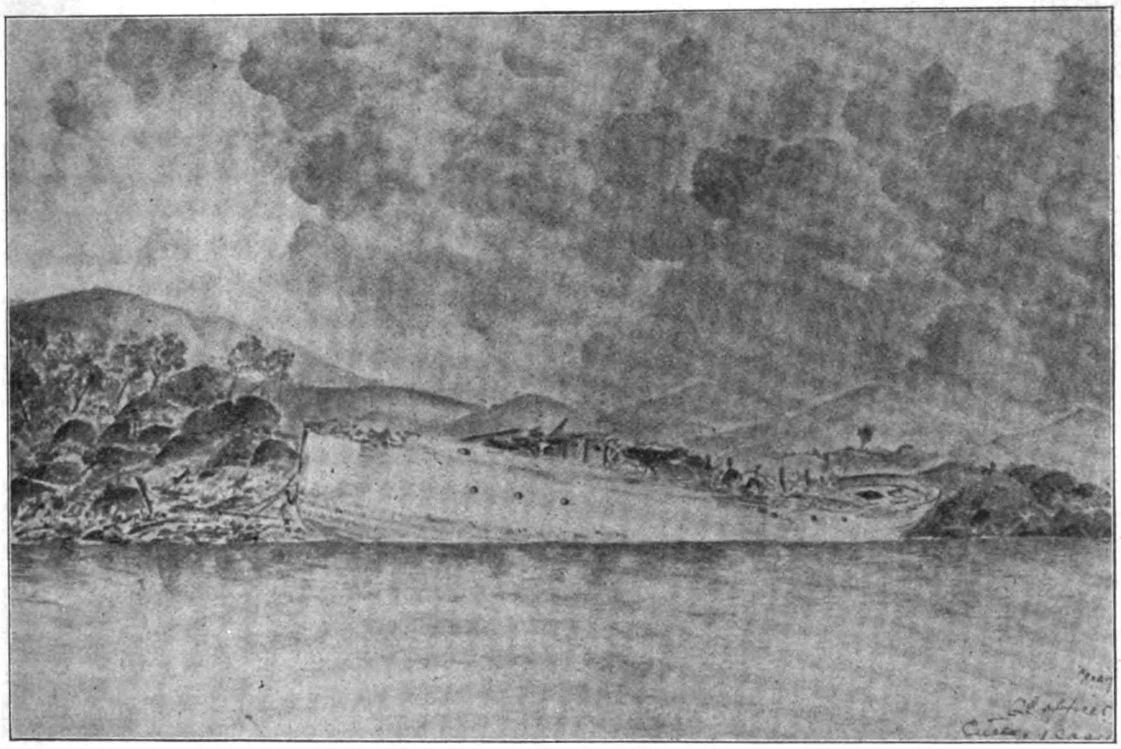
"Here in Barcelona (Sorsogon) the sea rose to a height of from 1 to 2 meters, and in the lower parts of the town to 3 meters."

We have, then, an unusual swell of the sea with fine weather far in advance of the storm; and later, during the height of the tempest, a rising of the waters in a way similar to that described in a report from Legaspi (Albay), a town further N. on the same coast.

CASE OF THE COAST GUARD CUTTER "LEYTE."—Here we can do no better than recall a practical case, one full of sadness but very instructive—we refer to the Coast Guard cutter *Leyte*.

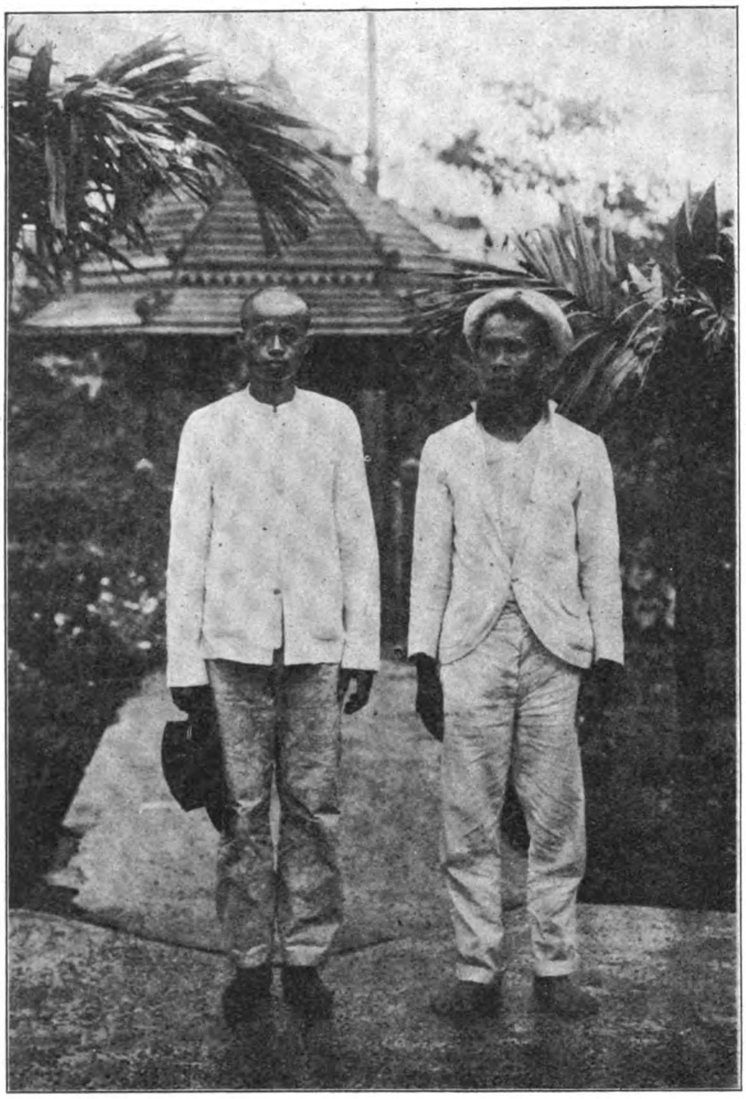
At 4 o'clock p.m. of the 25th the swell at Legaspi was enough to attract attention, although neither the sky nor the barometer indicated anything alarming. In a short time of one another two boats, *Cebu* and *Leyte*, sailed from the port. *Cebu* made for the nearby port of Sulat, where she weathered the storm without accident. *Leyte*, compelled no doubt by the needs of the service, headed for the open sea, for the experienced captain must have known what he had to encounter, unless, perhaps, he thought the danger far away. We do not know, but we shall always admire the man who could guide such a small ship through the heart of the storm without losing a man. And this he did; but, unfortunately, the other side of the trajectory which he encountered at midnight held greater dangers. Up to that time the wind blew from the first quadrant and the terrible swell ran from the second, and the two combined to drive the ship to the W. side of San Bernardino Strait. Once inside, the winds and the swell tossed



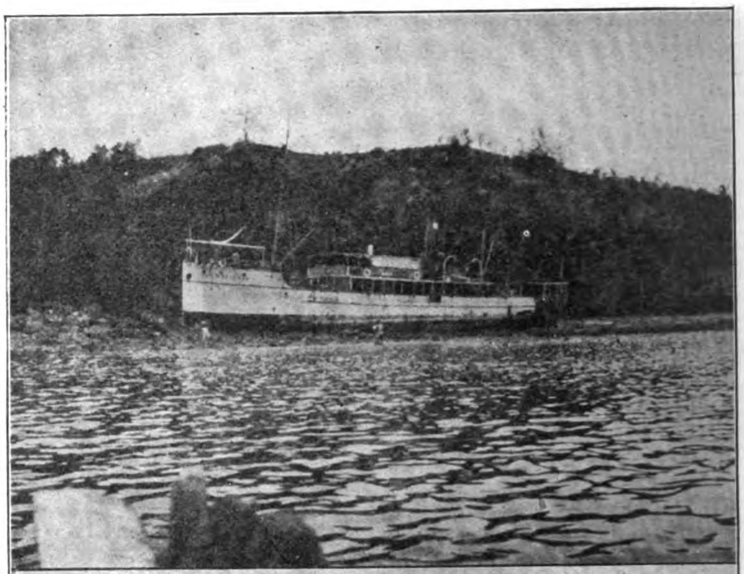


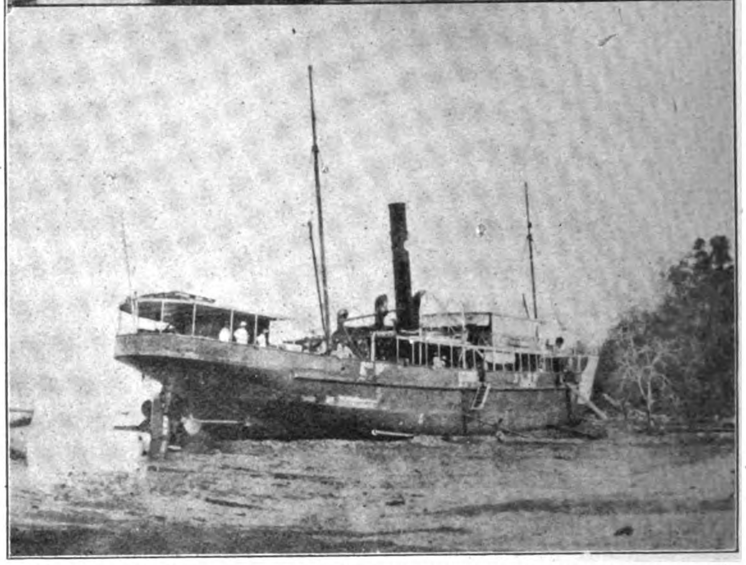
Drawn by Mr. A. Redifer, 2d officer of "Basilan."

TWO VIEWS OF THE WRECK OF COAST GUARD CUTTER *LEYTE*



STEWARD AND CARPENTER SAVED FROM *LEYTE*





BORONGAN ASHORE AT PUNTA PANUNTANGAN (MARINDUQUE I.)

the ship as a plaything. The immense billows leaped upon the shores, then broke and fell back, the waters rolling in every direction, so that the narrow strait boiled like a huge cauldron; and the hurricane winds beat down on the waters, lashing them with a fury impossible to describe. What a situation to imagine a ship in! And there was *Leyte*, in that desperate situation for nearly 2 hrs. At about 2 o'clock in the morning, in the midst of darkness and the horrors of the tempest, the soundings showed that the ship was being driven fast ashore, and the captain realized that nothing remained but to order all to put on life preservers. Five minutes later *Leyte* was thrown on the rocks off the NW. coast of Samar, near the Barrio of Lipata, and N. of the town of Allen (formerly Granja). The climax of this misfortune was reached when a great wave threw the ship over on its side, catching many of the hapless men between the deck and the rocks. Only nine survived the long struggle with the tempest and the sharp rocks, against which those who tried to escape were dashed by the waves. Two of the survivors, the ship's carpenter (a Visayan) and the steward (a Chinaman), after telling us of the scenes which we have just described, showed us the scars left on their bodies by the jagged rocks that dreadful morning.

"BASILAN'S" EXPERIENCE WITH THE CYCLONE SWELL.—We have said that the cyclone swell comes from the center, and so did *Basilan* meet it. According to the brig *Matilde*, which anchored in San Miguel Bay, the swell came from the NE., when the center was almost due S. This may be easily explained from the fact that while the brig stood in the bay near San Miguel Island the sea current could come in only from the NE. And this gives us an opportunity to point out that the swell of a typhoon may undergo great modifications according to the coast line from which it is thrown back. Hence, within the islands of the Philippine Archipelago the swell is rarely so well observed as in the Pacific and the North China Sea, where it is free to radiate from the center. In the seas and lakes of the archipelago the water generally moves with the direction of the winds. This conformity of the two is perhaps more dangerous for ships than the diversity in the open sea, for in the first the ships meet two powerful forces united; in the other the two forces run together at an angle which is more or less open, so that the ship may perchance avail itself of one against the other.

We are of opinion that it was the united forces of wind and wave which destroyed not only *Leyte* but also *Cantabria*, which put *Iruña* in such danger, grounded *Borongan*, and in fact caused the greater part of the sea disasters of the typhoon.

LOSS OF "CANTABRIA."—The story of the loss of *Cantabria* is as simple as it is appalling. It will be enough to recall the experience of *Iruña*. When Captain Lechiondo, taken almost by surprise off the S. of Burias Island, saw the wind increasing rapidly astern, with a rising sea from the NW., he turned S. towards Point Bugui, Island of Masbate, to search for a port of refuge. It must have been about 2 a.m. of the 26th; the vortex was then working havoc throughout the Province of Sorsogon. Between Burias and Masbate the winds had to back to the W. and SW., and the ship therefore had to bear all the force of the elements on the starboard. With her tackle broken and stearing gear disabled she was driven violently towards the N. shore of Ticao; and at this time *Cantabria* was probably not more than 3 ms. away. So certain did the utter destruction of all appear that the captain for the moment thought it useless to order on the life preservers. Suddenly a great sea, perhaps a wave reflected from the cliff in front, struck the ship and providentially turned the prow southward. At this unexpected moment the captain cried, "Full steam ahead!" and *Iruña* was saved.

The loss of *Cantabria* must have occurred under circumstances very similar to the above. Captain Madariaga was too watchful of his barometer to be taken by surprise. He was certainly seeking a place of refuge when an unforseen accident made it impossible for him to control his ship. Under such circumstances, who can save the ship? "God alone," says Captain Lechiondo of *Iruña*. It does not belong to us to discuss the question whether it was an explosion or the dashing against the rocks which destroyed so utterly the beautiful *Cantabria* and cost so many precious lives. One may judge of the terrible havoc wrought from the drawing made by Mr. George Gilchrist (see illustration), with which is presented a map of Bagababoy Island and vicinity to give a better idea of the scene of the catastrophe.

A practical conclusion may be drawn at once from the above considerations on the cyclonic swell. Whenever, on the coasts facing the open sea, as the E. coasts of the Philippines, an unusual swell moves in the direction which cuts that of the wind at an angle of 90 deg. or a little larger, although the weather may be calm and the barometer normal, there is good reason for fearing bad weather and watching the further movements of the barometer. On the interisland seas this sign is of less value, especially when the cyclone moves rapidly like that of the Cantabria.

UTILITY OF THE BAROMETER.—Of all the precursory signs of a storm the barometer shows the most exact conformity with the laws taught us by experience. To be convinced of this it is enough to study the barographic diagrams. The excessive rapidity of the Cantabria cyclone scarcely gave time for vacillations; the halt of the mercury in the hours of ascent was of the most remarkable we have ever seen, as was also the precipitancy of the fall on the approach of the vortex. The various reports of the storm make up a splendid apology for the faith which the Philippines place in the barometer, especially the barometer of Father Faura. This is the highest eulogy that could be paid to the teachings and labors of that illustrious meteorologist, who knew how to reduce to the simplest laws whatever of importance had been discovered about the storms of the Orient.

It is to be regretted that people do not get the good out of these instruments that they should; for it is not enough to secure a Faura barometer, even with the proper guarantees; but it is necessary ' to adjust the instrument for the place where it is to hang"—that is to say, one must take into account the height above sea-level of the barometer's position, in order to set the needle at the proper graduation to give true readings. Moreover, the interior mechanism, even of the best instruments, will oxidize with time, and hence it is necessary to have them cleaned whenever the oscillations are seen to be sluggish.

The air currents are not in such perfect conformity with the theory as barometer readings. The explanations are not difficult, for evidently the pressure is not as dependent on local topography as are the winds. From a constancy which is observed in some of the winds, as well in front of the vortex as behind it, we find that as a result the angles of the directions do not diminish, but rather increase as they approach the vortex, and *vice versa*.

This terrible scourge of typhoons has no other remedy than a knowledge of their proximity in order to prevent their disastrous effects. It is impossible to avoid them. Hence, whatever tends to spread the knowledge of their characteristic phenomena and to warn the public of their existence as soon as they appear is humanitarian in the best sense of the word.

[The famous Faura barometer, which is rapidly replacing all other similar maritime instruments, is manufactured exclusively by the well-known concern of La Esmeralda, of Paris and Manila, P. I.—*Editor's Note.*]

NEW JAPANESE PETROLEUM COMBINE

A general meeting of the shareholders of the Nanboku Seiku Kaisha (North and South Petroleum Company), which has been recently floated, will be held in Tokyo in a few days, and the purchase of oil wells in the Hokkaido, Aomori Prefecture, and Formosa, will be discussed. One of the promoters of the concern, Mr. Asano, has made the following statement in reference to the enterprise:—

"Everybody proclaims the necessity of furthering Japanese commerce and industry is a *post bellum* undertaking, but how many people are there who have a definite plan for carrying out this popular desire? In my opinion, quick and cheap travelling and transport is the most important factor to attain the desired object. If the price of coal—which forms the largest item of commercial expenditure—continues at the present high figures, the development of industry and commerce will be impossible. The original plan of the Toyo Kisen Kaisha (of which Mr. Asano is president) was to ship Japanese coal to South America to compete with Australian coal, which has monopolized the market for years, but competition in South America is now out of the question; on the contrary, coal is being profitably imported from India and Australia. My intention now is to ship cheap kerosene at San Francisco and import it into the Japanese Empire for steam fuel. A contract has been signed guaranteeing the importation of the oil for a term of 10 yrs.

"Nothing can be more urgent in this country than the increase of coal production. Last year I made inquiries whether there was any prospect of new colliery business being promoted in Kyushu, and found that all the coal-fields there had fallen into the hands of the financial magnates—the Mitsu Bishi, Mitsui and Prince Mori—leaving no room for others. I then made investigations in the Hokkaido, where there are rich deposits of coal, and the future of the Hokkaido Railway and Colliery Company is very hopeful. The company's system, however, is very old, and the harbor accommodation for the shipment of coal very poor. In concert with a number of friends, I have decided to work three coal-mines in the province of Ishigari, where a harbor is to be constructed at the estimated cost of -Y-5,000,000 and a railway from the mine to the harbor. Steps are now being taken for the commencement of these works, which will be under the control of the Ishigari Colliery Company, recently formed with a capital of -Y-10,000,000, entirely to be subscribed by the promoters. A foreign loan of -Y-10,000,000, is now being negotiated, and the foreign capitalists who propose to advance this money are doing so on condition that they be given shares in the company."

Mr Asano remarked that, in promoting the company, a novel idea was adopted—fifteen gentlemen were appointed promoters, of whom it was decided five should be men of over 70 yrs. of age and ten over 60. The five over 70 could be secured, but only nine over 60 yrs. could be obtained, and Mr. Asano, aged 59, was admitted to complete the board. The object of this plan is to disabuse the Japanese of the ancient idea that a man over 50 yrs. ought to retire from business and live quietly. They wanted to show how capable old men are.

Investigations show, continued Mr. Asano, the existence of rich oil fields in Formosa, the Hokkaido and Aomori Prefecture, and they have decided to form a company to work these. The development of industry, however, is impossible without cheap labor, but when the kerosene industry is fully developed in this country, which is rich in oil, cheap power for driving engines can easily be obtained.

ROMANCE OF A GOLD MINE

Another chapter in the romantic story of the Mysore Gold Mining Company closed, says *The Straits Times*, when, at the annual meeting in London recently, dividends were declared totalling 145 per cent for the second year in succession.

The profit for the year was stated to be £450,556, the superintendent reporting that the year had been one of the busiest in the history of the company. The mills had crushed 195,650 tons of quartz, yielding 184,957 oz. of bar gold.

As far as age and consistency in dividends are concerned, the Mysore gold mine is probably the richest in the world, and yet there hangs in the London office of the company a framed certificate of the transfer of 1,000 £1 shares at the price of 9 pence each! Such shares would be worth £14 each to-day.

For the last 10 yrs. the dividends paid have ranged between 100 and 150 per cent *per annum*. Since 1886 the lowest dividend for 1 yr. has been 10 per cent.

The original capital was £135,000 and in the 25 yrs.' history of the mine the shareholders have received dividends amounting to no less than £4,406,542, while the precious metal yielded in the same period has amounted in value to £8.308,014.

One of the officials of the company gave some details of the romantic rise and progress of the Mysore gold mine to an *Express* representative recently. He recalled a time, 24 yrs. ago, when ill-success had reduced the company's capital to about £2,000, and a winding up was only narrowly averted.

"A directors' meeting was held to consider the position, and it was proposed to wind up forthwith," he said. "Sir Charles Tennant was chairman, and he offered vigorous opposition. 'I did not come up from Glasgow to wind the company up,' he said. 'I think we should go a little deeper.'

"Captain McTaggart supported Sir Charles, and so did Mr. John Taylor. The rest of the directors walked out of the room. These three, getting their own way, spent the company's last few thousands in going a little deeper, with the result that nearly £8,500,000 worth of precious metal has been got out of a goldfield whose existence would otherwise never have been dreamed of.

"The goldfield was granted to the Kolar concessionaires by the Mysore Government. The concessionaires numbered five, one of them being General Beresford, and they had no capital at the time. They met with immense difficulties at first through famines and cholera epidemics. Then they managed to interest Sir Charles Tennant and the firm of John Taylor and Sons, and started serious work with a capital of £135,000 in July, 1880.

"The Kolar field provides work for 40,000 persons, and is in many ways a source of benefit to the Mysore Government as well as to the 5,000-odd shareholders in the mine."

NEW INDUSTRIES IN JAPAN

The yarn market of Japan was very favorable last year, and every spinning company in the country made enormous profits. As there are indications of yet greater prosperity, many mills have undertaken the increase of their spindles. At the end of 1905 there were 49 spinning mills in Japan, the spindles aggregating 1,330,000 and producing 905,537 bales of yarn, an increase of 210,324 bales over 1904. The number of operatives in 1905 were 12,811 males and 58,634 females, earning averages of 17 and 11 cts. per day. The Fuji Spinning Company's profits for the last half of 1905 was $405,000 gold, and a semiannual dividend of 10 per cent was declared. The company decided to increase its capital by $1,200,000 for the extension of mills. The directors of the Amagasaki Spinning Company have decided to increase the spindles by 20,000. Another company has decided to establish a mill at Shanghai, at a cost of $1,500,000.

Cotton weaving also made great strides in Japan last year. In the preceding year only 9 spinning mills were engaged in weaving, with 5,000 looms, the number increasing to 7,472 looms by the the end of December, 1905. The production of cloth last year was 60,000,000 yds. Of the spinning mills which have just begun weaving the Tsushima, Chita, and Nagoya companies are fitting looms for weaving narrow cloth for the markets in Formosa and Korea. The 200 looms now being worked in the Kanegafuchi mill are an experiment, the object being to determine the best in machinery. The project is to install several thousand looms. The production of cotton cloth is rapidly increasing. Fears were entertained by yarn manufacturers that the great increase in the number of spindles would glut the market with yarn, but these fears have been altogether dispelled. It is now feared that the time may soon come when sufficient yarn can not be supplied to China and the home market, in consequence of the more rapid increase in the weaving industry than in the addition of spindles.

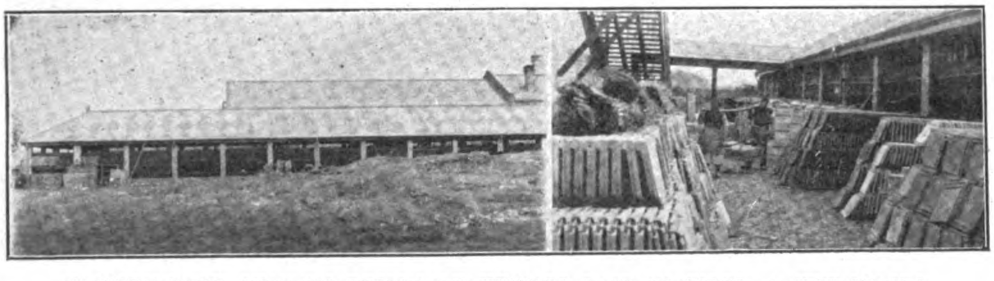
Several new industries are about to be established in Japan. One of these is the Toyo Paper Mill Company, of Osaka, which has chosen a factory site on the Kanzaki River, and will manufacture rice paper. The Ishigari Colliery Company, capital $7,500,000, has been formed to establish coal mining in Hokkaido Province, and build a railroad to and coal terminal at the coast, where a harbor will be established to accommodate vessels of 10,000 tons. They expect to handle 2,000,000 tons of coal annually. Steps have been taken to establish a large steel foundry near Kokura, and the Sumitomo steel foundry at Osaka is to be extended. All this industrial activity ought to mean some orders for improved American machinery.

THE A. BUTLER CEMENT TILE WORKS, LTD., SHANGHAI

MANAGEMENT OF THE A. BUTLER CEMENT TILE WORKS, LTD.

The late Count von Butler, one of the most prominent pioneers of new industries in China in his time, was the originator of what is today known as The A. Butler Cement Tile Works, Ltd., a progressive and well-managed industry of Shanghai.

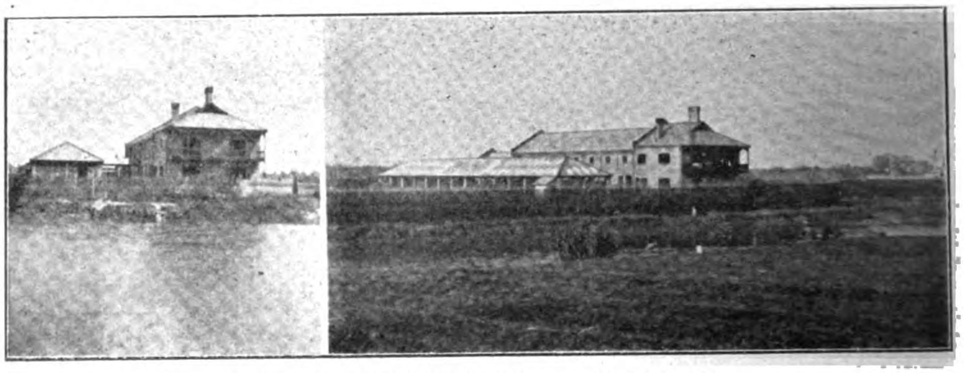
For years Count Butler had been experimenting with the manufacture of artistically colored floor tiles and kindred products of the same material, and after his death, which occurred in the spring of 1904, Mr. F. E. Schnorr, the present general manager of the company, who assisted Count Butler for some time in his work, succeeded in floating a company with the object of further promoting this new industry in China; and so successful has he been in his endeavor, that at present, after barely 2 yrs.' existence as a company, the *Star & Crescent*—the company's trade-mark—tiles hold the local market, and are recognized by leading architects throughout the Far East to be equal to any imported makes. There are cases where they have even given preference to the latter, on account of



FACTORY ROOF, SHOWING DESIGN OF INITIALS LAID IN TILES—A FEW STACKS OF ROOF PLATES

their absolute evenness and the ease with which any unskilled mason can lay them to satisfaction, a point which in China and with the Chinese did not fail to make its mark.

VARIEGATED LINE OF PRODUCTS.—Not only do the works turn out floor tiles of every description—from a plain kitchen tile to the most refined hall or verandah tile—but their line of produce extends also to roof tiles of various shapes, and all shades of color that may be desired, from perforated ventilation bricks, specially-shaped foundation and well bricks—conical or otherwise—to pavement plates; and last but not least, their specialty, stable flooring. This last-named product consists of fluted bricks, after a pattern adopted by British cavalry stables, that makes an ideal sanitary floor for any housing for animals; and, while offering all the advantages of other floors for such purpose, it does not have the disadvantages of any of them. Not slippery, easily cleaned and therefore always clean, neither too hard nor too soft, it is the *acme of perfection* in this line.



SOUTH FRONT AND WEST VIEW OF THE WORKS

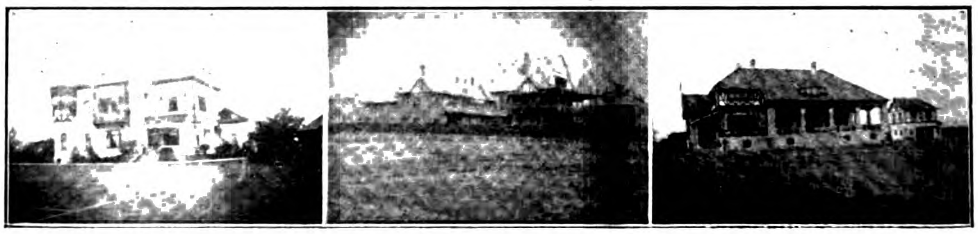
DEMAND FOR MATERIALS.—The demand for all these materials proves their best their worth, and of the many public and private buildings that are either roofed or floored with Butler tiles, mention may only be made of His British Majesty's consulates at Shanghai and Nanking; the British and German post-offices; the Hongkong and Shanghai Bank in Shanghai and Peking; the Deutsch-Asiatische Bank; the Russo-Chinese Bank; the Chartered Bank; the Shanghai Gun Club; Cricket Club and Deutscher Garten Club; the new Concordia Club; the Alexandra building; the American Mission and St. Luke's hospitals; the Imperial Chinese Customs printing offices and the indoor staff quarters; the Astor House and Metropole hotels, besides scores of other structures too numerous to mention.

MANUFACTURE OF THE TILES.—The cement and the sand, the two principal constituents of the tiles, are obtained locally—at least the latter is—while most of the former and all the colors and other raw material are imported direct; and it is most interesting to see, how, after various transformations through grinding and mixing, these constituents—the plain yellow sand and the grayish cement—are turned into the most vivid colored tile of a mosaic-like composition, or a softly-toned roofplate.

A semi-cylindrical machine with many propellers like plates first of all mixes the base material, the mortar. After amalgamation this mortar is placed in the moulds and then, by way of design plates similar to those used in stencilling work, the various colors, one or two or even seven, are laid on. These colors are first ground to the finest dust in ball mills and the way to mix them is, of course, the great secret of the manufacture; consequently the color-mixing room is the *forbidden land* of the factory.

From hence the tile-mould and all passes into one of the large presses and though no steam power is employed in the manufacture under a hydraulic pressure of about 200,000 lbs. they are put into shape and given the necessary firmness. They leave the mould and go to the many tanks for setting; and after that it requires—since, of course, no kilns or backing process can be made use of on cement goods—a regular treatment of washing and scrubbing and watering, and drying over and over again, of about 3 mos., before they are ready for the market.

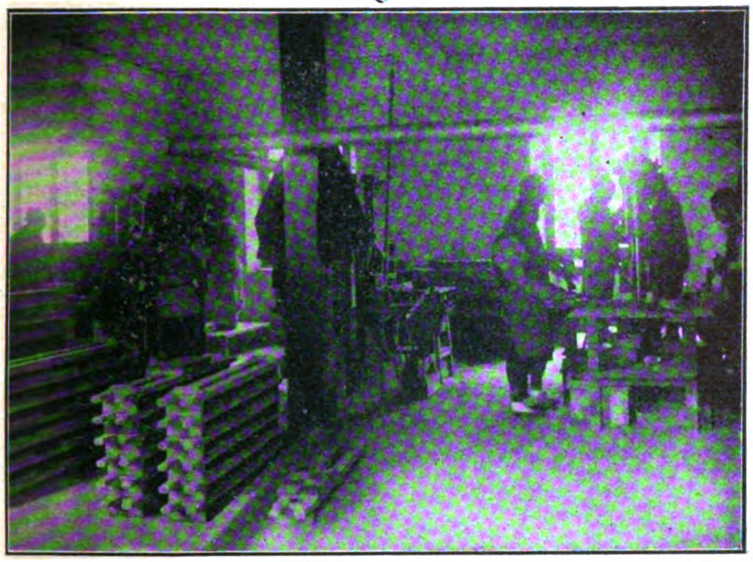
This may seem rather a long time—and as a matter of fact 1 m. more or less would be quite sufficient—but the principle of the company is to supply only tiles that have been allowed to set and harden to the greatest possible extent, and therefore 3 mos. have to elapse before the finished article is allowed to leave the works.



THREE SHANGHAI RESIDENCES ROOFED WITH "BUTLER" MATERIAL

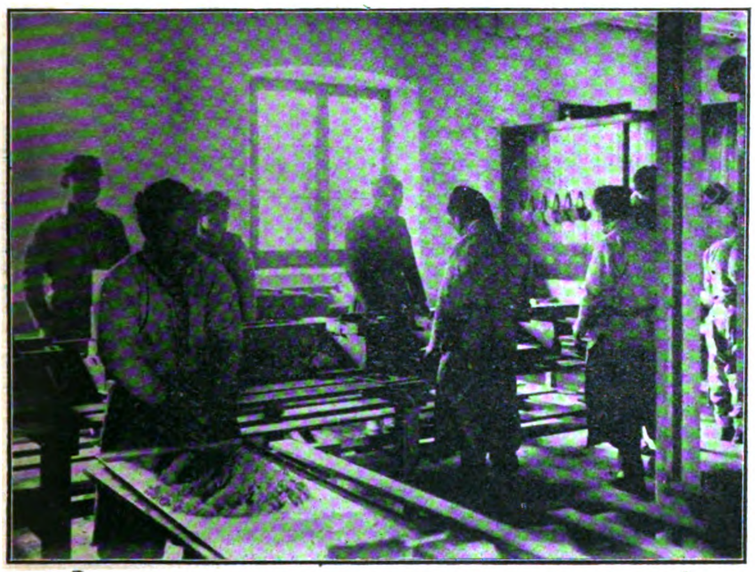
The water supply comes from a specially-designed well of a depth extraordinary for Shanghai—about 30′—by means of which all water used is filtered to a certain extent before it reaches the tanks and reservoirs, and this clever contrivance was constructed and built by the superintendent of the works, Mr. G. Greiner.

COMPANY'S FACTORY AND PROPERTY.—The factory and property of the company, conspicuously situated on the N. bank of Soochow Creek, about half-way to Jessfield, occupy an area of about 90,000 sq. ft., and the output—at present about 700 floor tiles, 1,000 roof tiles and 600 bricks or paving plates daily—comes from a plant of six presses and a goodly number of subsidiary machines. The capacity of this plant, however, is about three times as great, if necessary, and the steadily growing demand for the company's manufactures, notwithstanding the difficulties a new enterprise of this sort would naturally have to overcome, has made it necessary to employ on an average 40 men lately, as against 10 to 15 at the time of starting the company, when there were only two presses put up

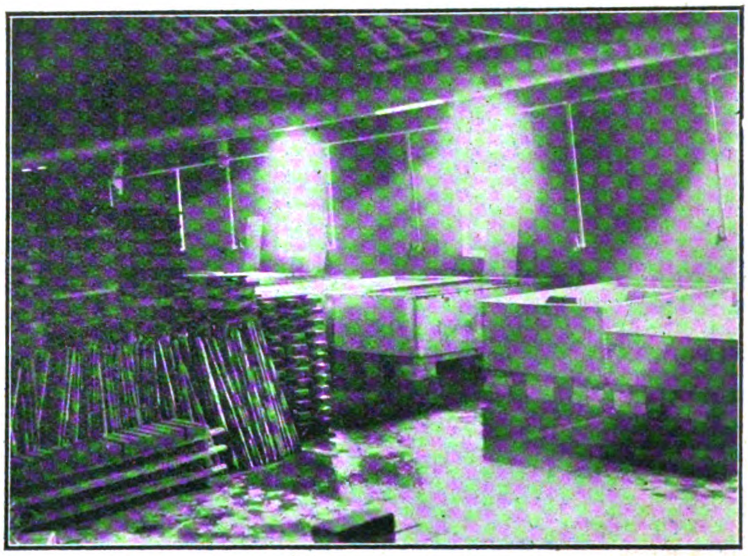


AT THE PRESSES

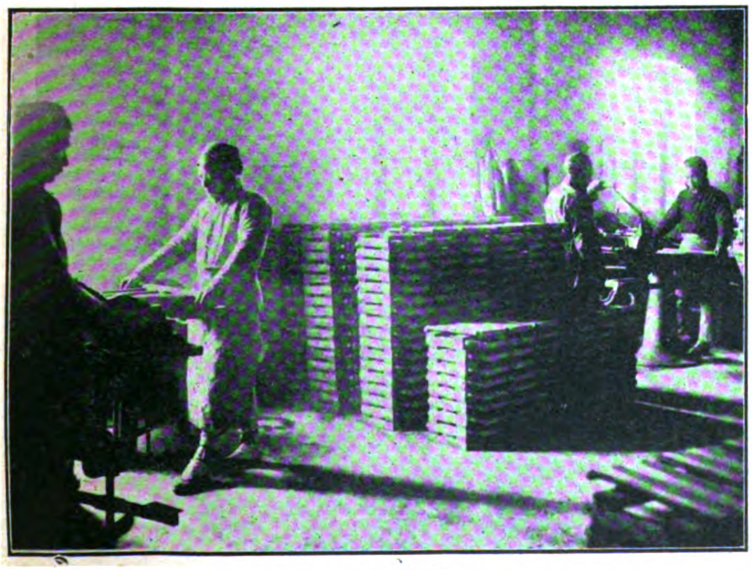
MORTAR MIXING AND GRINDING



COLOR MIXING



SETTING ROOM WITH THE TANKS

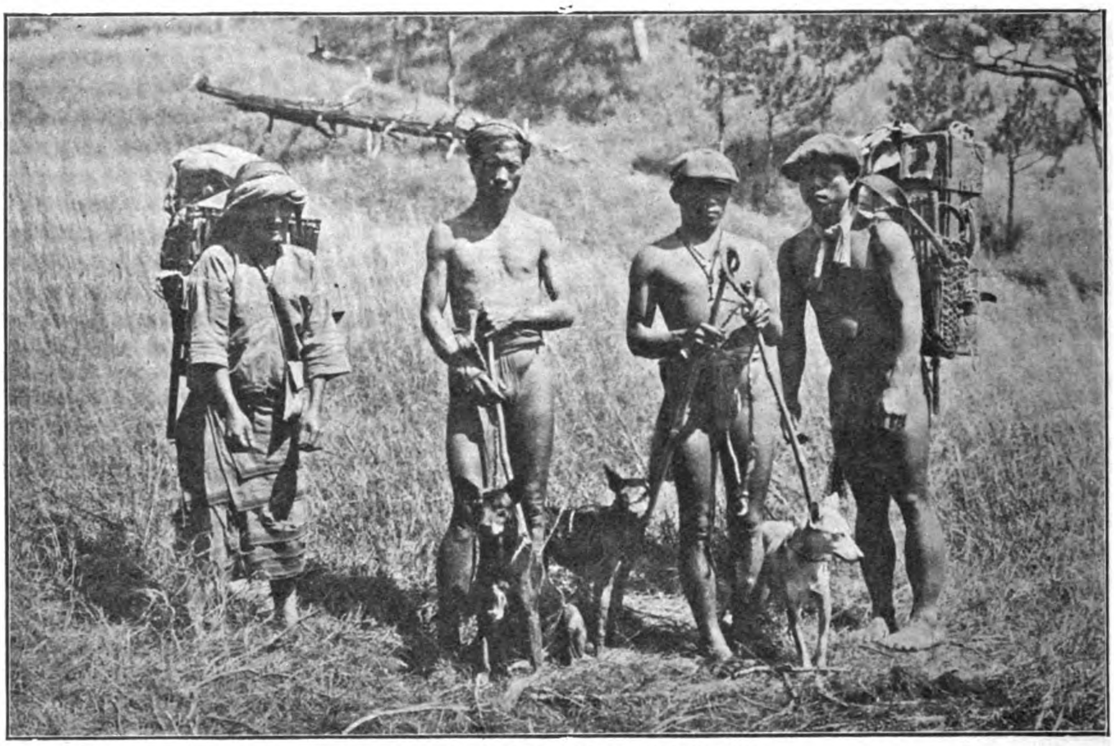


MAKING ROOF TILES

A FEW 10,000'S OF FLOOR TILES READY FOR MARKET

PRELIMINARY RECONNOISSANCE OF THE MANCAYAN-SUYOC MINERAL REGION, LEPANTO, LUZON, P. I.

(By ARTHUR J. EVELAND, M. E., Government, Geologist)

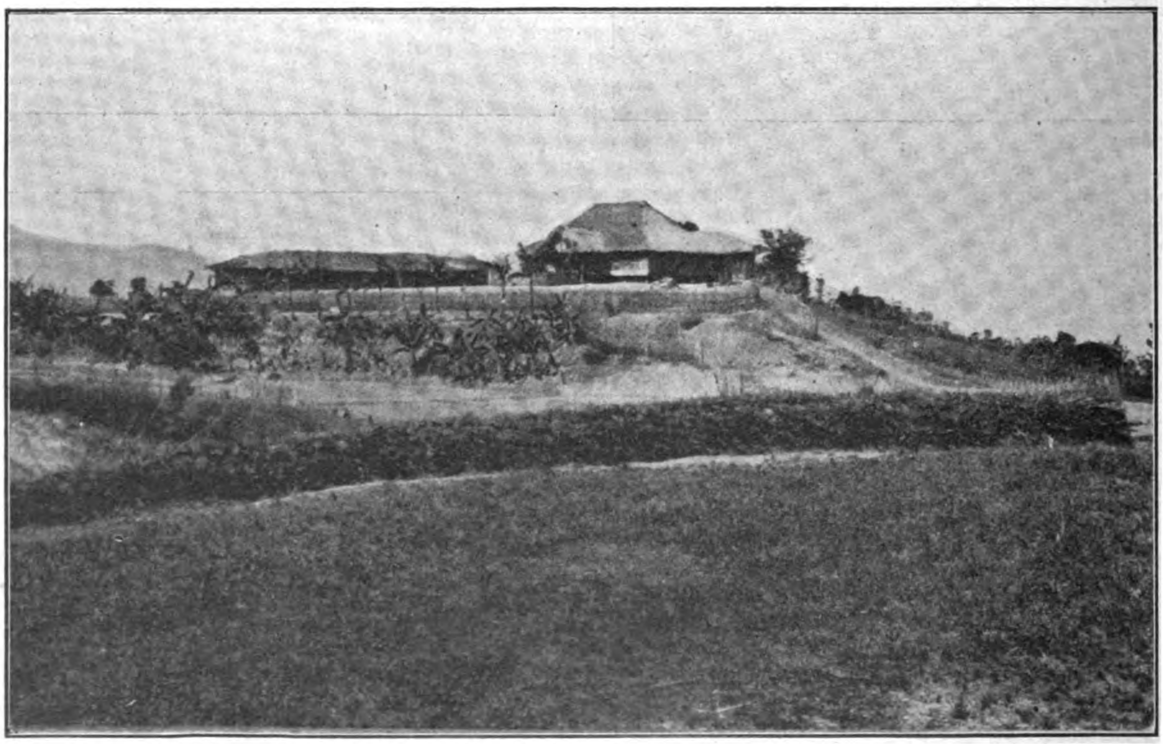


TRANSPORTATION METHODS IN LEPANTO

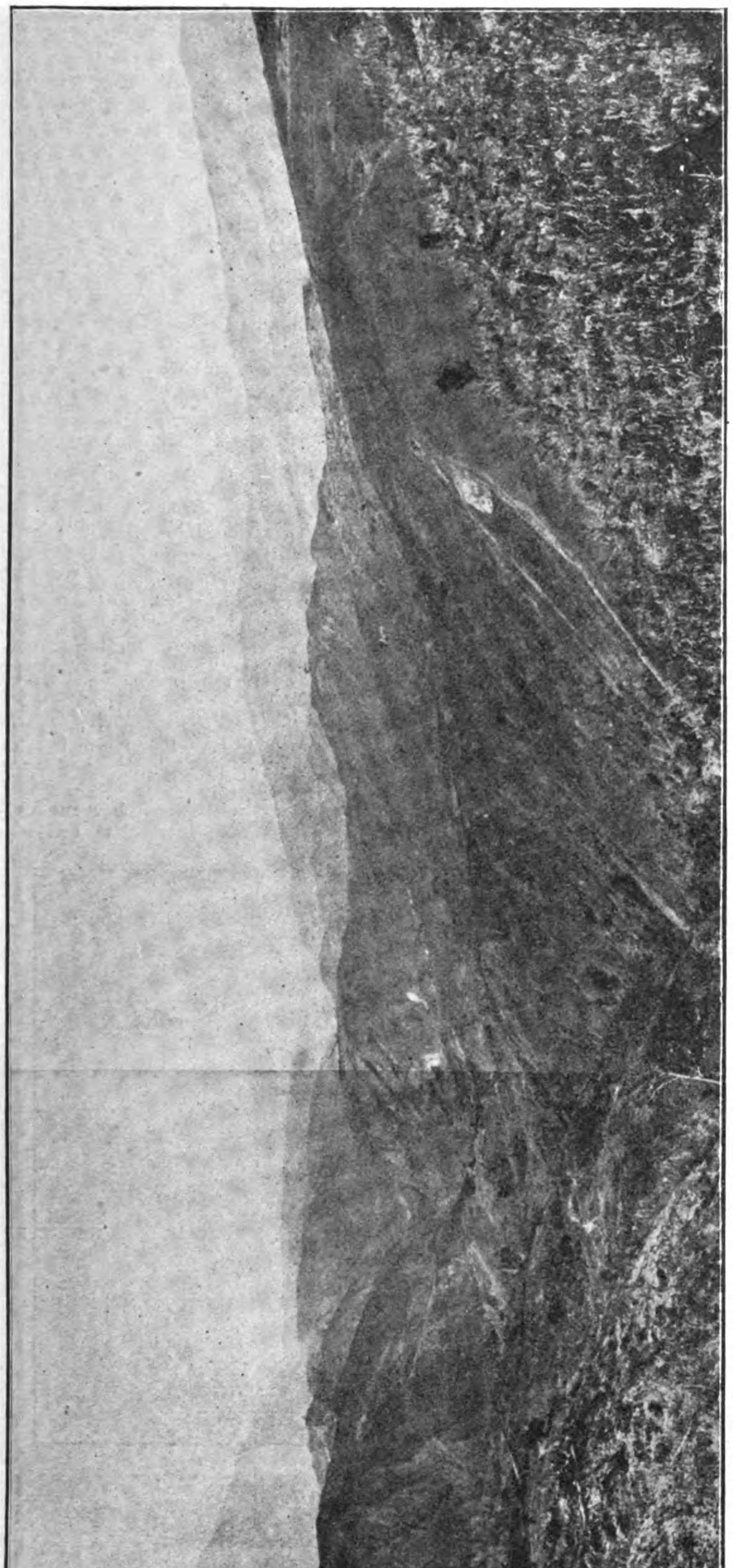
CHAPTER I

The field work upon which is based the following preliminary report on the mineral deposits of the Province of Lepanto, Luzon, P. I., occupied 3½ mos. This period may by no means be taken as the time available in the investigation of the area, as the early advent of the rainy season rendered work impracticable approximately one-half of that period, the daily torrential rains terminating field work with unfailing regularity. In addition to the time spent actually in the field, six weeks were required for transportation to and from Manila, and at the close of the season's work, discontinued when it was absolutely impossible to do more, one section of the party, with the collections and equipment in its care, occupied six weeks in the return to Manila.

Topographic mapping has as yet not been undertaken in the Philippine Islands. Only to a small extent has any primary triangulation work been carried on, and that only on the coasts and harbors, under the United States Coast and Geodetic Survey. The party was therefore organized as completely as possible under the conditions, for varied and general work, and consisted of the writer as geologist and chief, with Mr. H. M. Ickis and Mr. M. Goodman, field assistants, and two rodmen. The absence of one field assistant was unavoidable for over a month, and the connection of one rodman with the party was severed almost immediately upon reaching the field, so that the party practically consisted of the geologist in charge, with one field assistant, one rodman, and such native (Igorot) labor as could be obtained, for the major part of the time.



HACIENDA TUBOC



LOOKING NORTH DOWN THE VALLEY OF THE MANCAYAN RIVER, MOUNT MALAYA ON LEFT

No detailed investigations, except such as could be profitably carried on with the limited force and time at hand, were contemplated. The region which was to be visited has been long prominent in the infant mineral industry of the Islands, and only such work that would give a better and fuller knowledge of the mineral resources of the region and an aid to those interested in its development and future progress was undertaken.

For these and other reasons this report is not comparable with more extended and detailed studies, which, it is hoped, are to be undertaken in the near future, but attempts to approach more closely such reconnoisance work as was carried on with wonderful success by the United States Geological Survey in Alaska. Indeed, the conditions of Alaskan work are not greatly dissimilar to the conditions under which all scientific field work is accomplished in the Tropics. The lack of transportation facilities is one of the worst evils to deal with. For every item in the equipment and supplies of use during a more or less extended field trip there is a problem large in its proportions. In the present work the absence of horses or any pack animals thrusts the burdens, literally, on the shoulders of mankind. And the Asiatic races, while much may be said in their favor, do not, as a rule, take kindly to continued labor.

In carrying on geological work one meets with the excessive vegetation of the Tropics, limiting one's vision to a matter of feet, and, in correspondence, the great thickness of soil and decomposed rock material render the solution of even the most simple stratigraphic problem a labor in itself. And considerably not the least in proportions are the climatic conditions which Europeans have to face.

In view of these conditions, therefore, the report submitted is to be understood to be purely preliminary in scope, and the results and deductions based upon it may possibly be subject to future revision and modification when more detailed investigations are carried out.

The actual route and means of transportation of the party are briefly as follows:—The area indicated lies approximately 160 ms. almost due N. of Manila. The railroad from Manila N. at present only reaches Dagupan, in the Province of Pangasinan. As the most direct means of reaching the territory, then, the party, with its outfit, provisions, and other equipment, was embarked on the Coast Guard steamer *Masbate* and was disembarked at Candon, in the Province of Ilocos Sur.

The trail inland, up the valley of the Balidbid River to Salcedo, N. along W. flank of the Cordillera del Teila to Concepcion, then over the Teila Pass to Angaqui, and S. to Cervantes, in the valley of the Abra River, presented no other difficulty than lack of transportation. The first permanent camp of the Mining Bureau party was pitched at Mancayan, the *barrio* or village which was the seat of mining operations of considerable importance in the past.

For 2 mos. Mancayan was made the base of operations for that portion of the mineral region. At the end of about that time camp was shifted to Suyoc, some distance to the S. from which the operations were completed.

It may be well to give a brief résumé of the work done, in order that the understanding may be fully clear.

Of prime importance to any geological work, the topographic base map merits the first consideration. As the relative position of this area could not be determined from any previous maps or data, recourse was had to astronomical methods, and permanent monuments erected on determined points. Checking on these, a base line was laid out, according to the customary procedure, with its conjunctive system of tertiary triangulation over the area. On account of the numerous claims recorded and the evident disposition of the mining fraternity to develop and operate this district, a rather detailed topographic map of a region about 6 ms. long and 4 ms. wide, on a scale of 400′ to 1″, was made. It is believed that this map will be of inestimable value to future development work in this district, and therefore more attention was given to it than the general character of the investigation would seem to call for.

The general investigations were conducted along three distinct lines, *viz*:—

(1) A hasty reconnoissance of a large area considerably beyond the immediate vicinity of the "mineral region."

(2) Route surveys, from the coast to the mineral region, by two distinct routes.

(3) A detailed study, as far as the operations permitted, of the ore deposits and geology of the district proper.

In connection, data were recorded for the future more purely geological work in the Islands, the work instituted under the Spanish régime by Abella, Centeno, Santos, Von Drasche, and others, and which will be carried on under American direction and operation.

As stated before, the advent of the rainy season terminated further work, and the party returned to Manila. The geologist proceeded overland to the S., through the Province of Benguet, for a hasty reconnoissance of the valley of the Agno River, and to examine the mineral districts of Benguet in order to prepare for the field work in the future, when these areas will be taken up. The mountain trails were followed as far as Baguio, the capital of Benguet, and from there on the route was *via* the new government road to Dagupan, where connection with the railroad is made. At the time of the arrival of the geologist in Dagupan railway communication was broken, due to heavy floods, and a steamer was taken to Manila. The entire trip S. was made under extremely hard conditions, the floods and storms attendant upon the rainy season being the prominent opposing factor.

The remainder of the party, under charge of Mr. Goodman, field assistant, took the back trail *via* Angaqui, Concepcion, and Salcedo to Candon. Boats could not make a landing at that season of the year, neither was it possible, owing to the flooded condition of the coastal plain rivers, to proceed N. to a possible favorable embarking point. In fact, the return from Cervantes to Candon was attended with the utmost danger and hardships at all stages of the route, and that, in addition to bringing safely through the equipment and collections, a detailed route survey was made is greatly to the credit of that portion of the party. It was able to make its way S. to San Fernando,

thence *via* steamer to Dagupan, and from there, railway communication having been restored, to Manila. From San Fernando, while awaiting transportation to Manila, a survey was made *via* Baon, Naguilan, and Sablan, to Baguio, the capital of the Province of Benguet, more or less the central point of the mineral district of that province. By the two route surveys described above the two main lines of communication to the coast from the mineral regions have been accurately mapped for the first time. Comment on the future value of these surveys is unnecessary, and they are included in the text.

The foregoing outline gives briefly the actual movements of the party, in their general relations to the Island of Luzon. Of the difficulties that were met with and overcome, nothing can be written that adequately presents the true conditions. Geological work in the Tropics has for its attendant evils, and to a very small extent, benefits, certain conditions that nothing but actual experience reveals.

ACKNOWLEDGMENTS.—In the course of the field work the Mining Bureau party had reason to be grateful for much assistance in various ways. An attempt is here made to acknowledge these aids and to express the keenest appreciation of the many courtesies which were extended and which in many cases were far beyond the requirements of the official duties of the several gentlemen named. This appreciation is due to Captain F. F. Stewart, of the Coast Guard steamer *Masbate*, for much information and for assistance in embarking and disembarking the party and equipment; and to Mr. William A. Reed, Governor of Lepanto Bontoc; Messrs. Kane, supervisor, Moir, fiscal, and Travis, treasurer, of the same province, for their uniform courtesy and assistance. To Señor D. Martin Mills, for his cordial and unfailing hospitality and much information, and to Señor Don Augusto Fuster, administrador de las Minas de Cobre, Mancayan, for valuable data concerning the past condition of the Mancayan mines. To Messrs. Gaffney and Henry Reeder, who, at the advent of the Mining Bureau party, were the only American miners at that time in the district, the writer is indebted for a great deal of information and aid, most of which, without their guidance, would have been missed. These latter gentlemen gave their services freely as guides in the various explorations, during many days. To Mr. William Woodward thanks are due for the use of a substantial house in the latter part of the survey, in the inclement weather; and lastly, but by no means the least, to the many officials, provincial and local, of the regions through which the party passed, and who in every case gave all the assistance in their power.

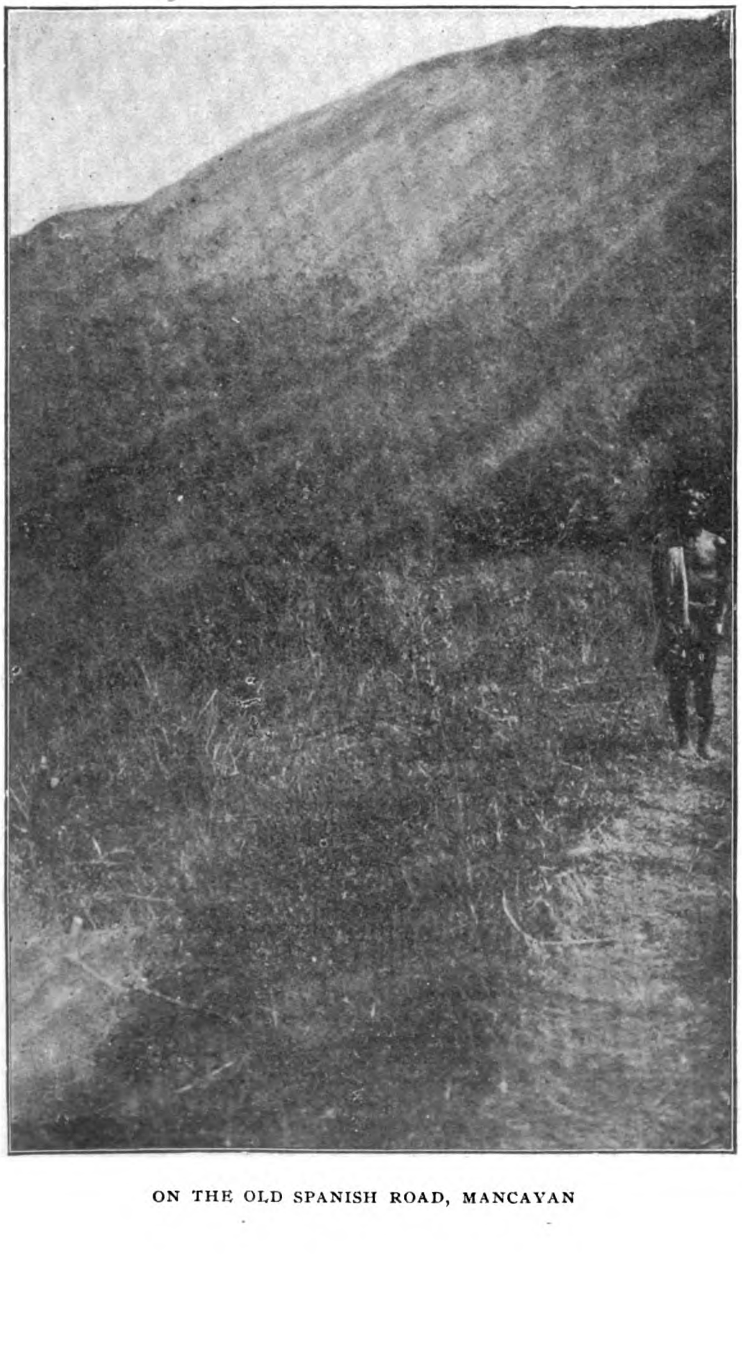
CHAPTER II.

HISTORY AND PRODUCTION.—The history of the Spanish mining enterprises, whether in the Philippines, South America, or Mexico, is invariably interesting. The story of the mines of Mancayan offers no exception to this, and in view of the present development of the district it is believed it may be of sufficient importance to be given briefly here.

According to the previous writers, the attention of the thinking public of the Philippines and Spain, and especially of those interested in the mining industry, was for a long time drawn to the N. portion of Luzon as a possible source of mineral wealth, as there appeared, and in some abundance, pots and other implements of pure copper which were said to have come from there. Santos in his report says:

> Even in some of the most ancient histories of these Islands (Philippines) copper is cited, among other metals, as one of the products which nature affords with considerable abundance, the natives of the mountains utilizing it for arms, ornaments, and in a profitable business. But the most noteworthy document, which claims attention by its official character and its exactness, as later is verified, is the communication to the governor of his excellency the captain-general, D. Pascual Enrile, of the 20th of June, 1833, in which he states that the utensils that the Igorrotes of the rugged mountain ranges which separate the Province of Cagayan from that of Ilocos make of the copper from the mines have been known for several centuries. * * * With this communication were sent minerals, bars, and spikes of the metal mentioned, which, assayed in the direccion general de minas, gave such good values that not only was it recommended that means be adopted for the exploitation of so much mineral but it gave rise to the creation of the inspection of 1838 and the mining law of 1846.

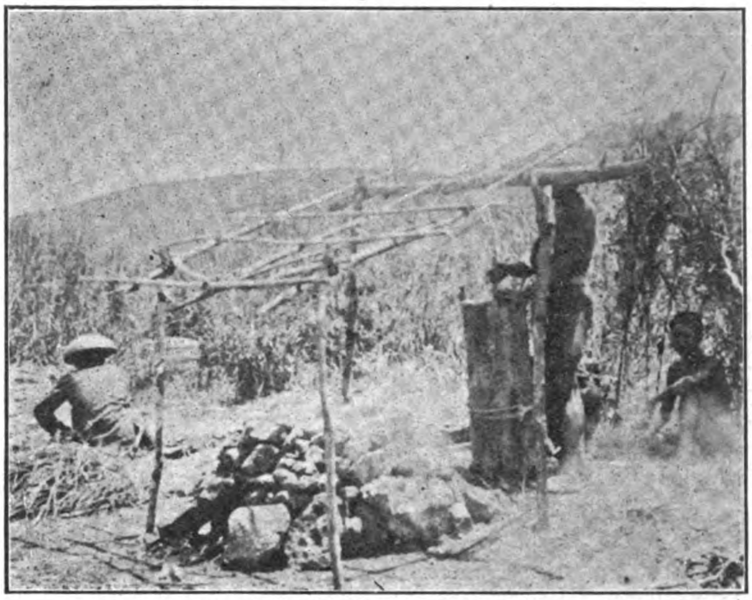
From such sources as these it became evident that valuable mineral deposits existed,



ON THE OLD SPANISH ROAD, MANCAYAN

IGOROT COPPER SMELTING.—FIRST ROASTING; COMPLETION OF ROAST

IGOROT COPPER SMELTING.—CLEARING THE MATTE



IGOROT COPPER SMELTING —ROASTING THE MATTE

and in 1850 it culminated in the sending of a military expedition into the region to make an investigation, a show of force being essential to Spanish exploration.

With this expedition was sent D. Antonio Hernandez, one of the government engineers, to make an investigation of the deposit, map routes to it, collect specimens, and in general obtain as much information as possible for the public. In this regard it is interesting to note the message of the inspector of mines, Señor Sainz de Baranda. He says:—

I believe it is my sacred duty to give you a very special command. The mines are situated at a place very distant from all centers of population and the inhabitants of the country, if not at war with the Christians, are not by any means subjugated, and of a savage and ferocious character. I charge you, therefore, do not expose your life imprudently, or your health, for not only the examination and the mines but all of them and all the savages of Pangasinan and Ilocos combined are not worth the life of a Spaniard, and least of all of an engineer of your merits and circumstances.

Hernandez left Manila February 3d, 1850, and proceeded to Mancayan, *via* the E. coast of Luzon to San Fernando, thence overland to the mines, returning about a month later, having spent 17 days in mountain travel. His description, preceded by the general narrative of the expedition, is as follows:—

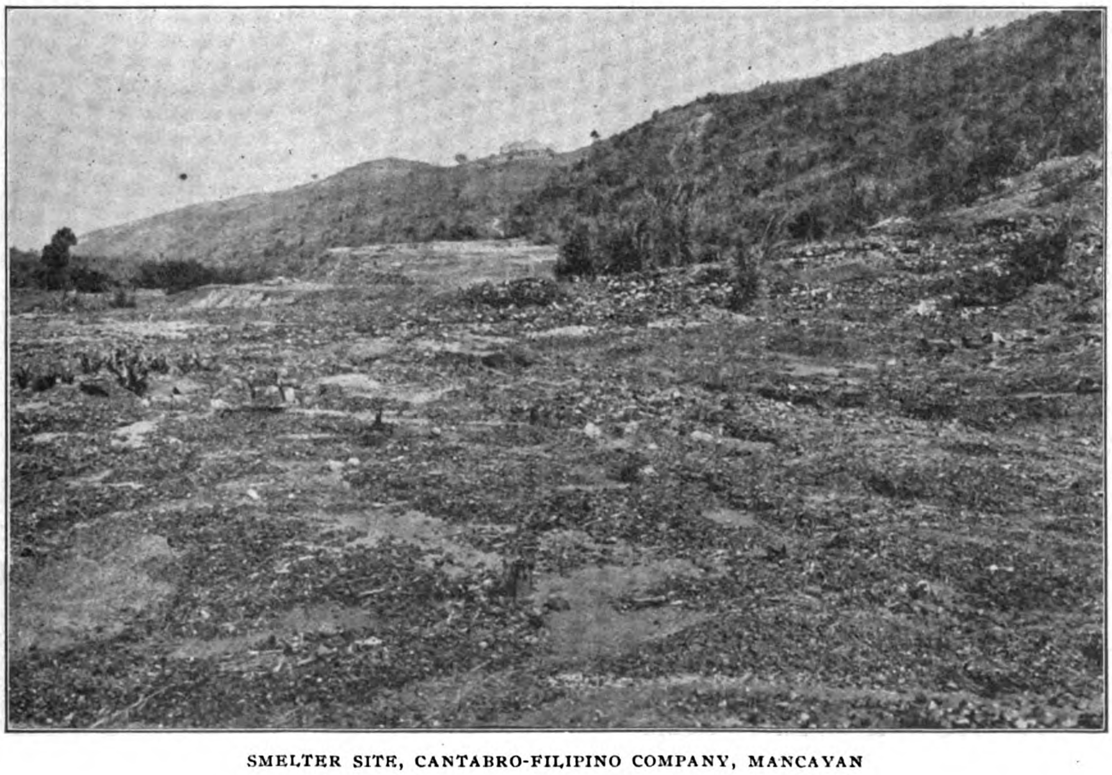
Marching from Sugud to NNW. to find the valley of the Abra, there is found, after 3 hrs. of travel in the territory of Mancayan in the immediate vicinity of the rancherias of Pacpac and Tavio, a deep glen where runs the Arroyo Tavio or Magamban. This glen is bounded on the N. by the mountain Aban, on the S. by the Sapit, and on the E. by the Tavio, more extensive and elevated than the other two. In the southern side of the first is presented a cut or face of 60′ or 70′ in height and 190 or 200 *varas* (600′ or 650′) in length, caused by the landslides which have been produced by past excavations in the middle of the declivity, and the constant action of the atmospheric agents, showing in places a considerable mass of compact quartz with pyrite of iron, whose limits can not be figured, because it is seen to be covered by soil, not presenting apparent stratification, but broken and full of fissures on all the surface; some parts are filled with decomposed quartzose or earthy substances stained generally by oxides of iron or carbonate of copper, and others, although in lesser number, hung with small crystals generally of barite.

The quartz carries in some places gray copper, now intimately disseminated in the mass of the rock in the same manner as is the pyrite of iron, again in small veins from two to three fingers in length, and finally in irregular cavities and in pockets of no great extension. Sometimes the mineral is found compact with the quartz without any appearance of continuity; at others filling more or less completely the crevices of the rocks, leaving several fissures or species of geodes with marked crystallization; and in others finally, and this happens in preference in the masses of larger size, it is found separated from the quartz by well-marked bands of gouge of selvage, of a species of fine clay and of great whiteness, although frequently stained by the green carbonate of copper.

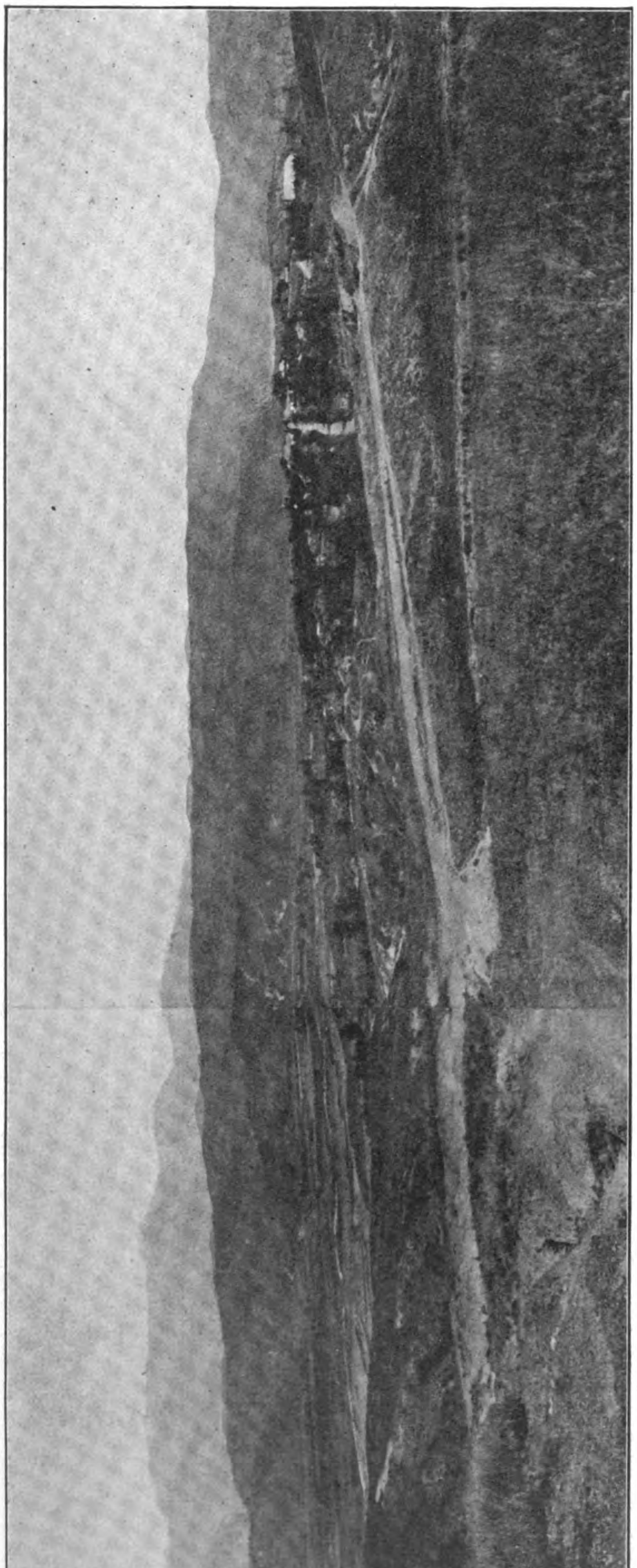
Over the larger concentration of gray copper which is presented to view there has been opened a species of irregular excavation of some 4 *varas* (13′) in depth and in one of the sides is found a face of the mineral 7′ in width and 10′ in height, terminating in the foreground in selvage and empacked in a tereno summarily weak and decomposed. This being under the surface covered by rocks and fragments of quartz, it is impossible to see where or in what form it is extended; in a like manner the cut of the excavation does not permit of judging as to extent of the deposit either in length or depth, seeing only that it continues to the interior of the mountain and to the bottom of the work.

The mineral pertains to the kind called *tenantite* (tedrahedrite?) or arsenical gray copper, being a sulphide of copper, arsenic, and iron, and containing above 44 per cent of copper, 29 of sulphur, 18 of arsenic, and 9 of iron, and not including the silica, which is found mechanically mixed and therefore in variable quantities. This species, which is that which constitutes the deposit, is found in a mass, somewhat crystallized, and with the crystals there are found, although in small quantities, small portions of pyrite of copper, anhydrous crusts of silica, tablets of barite covered by crystallized quartz, and some pyrite of iron. The matrix is compact quartz with some barite, and many specimens offer the aspect of a breccia of quartz with cement of gray copper.

The works, which consist only of holes or small caves of few varas in extension, are found scattered over a distance of approximately 180 *varas* (600′). And judging by the considerable quantity of wash which covers the ground to the arroyo, and the cut which is seen in the side of the mountain, attended on the



SMELTER SITE, CANTABRO-FILIPINO COMPANY, MANCAYAN



CERVANTES AND THE ABRA VALLEY

other hand by little present activity of works, it is to be presumed that the exploitation of this deposit dates back to a very ancient period. In the beginning they probably worked on top of the site where they are now working, and by degrees, after having exhausted the mineral immediately under the surface, have gone lower toward the arroyo, thereby precipitating, little by little, through lack of system, a considerable mass of rock, which has removed a large part of the ancient works; nevertheless, there are yet preserved parts of it of greater extent than those which are now worked.

To open a work the Igorots commence to collect water in a kind of pool or basin which they have formed on top of the declivity, letting it out through one opening, thus causing to fall with considerable violence a mass of water, uncovering the mineral, and indicating the more appropriate places for exploitation. The excavations are executed by means of fire. Placing a little wood fastened to the wall, they ignite it and the following day the mass is found split, which they easily separate from the copper by crushing with stones.

Although the mass of the deposit is a compact quartz very consistent, it is full of fissures, which makes it necessary to support it, and for this they employ small logs of pine which they place in irregular numbers at the places threatening ruin; notwithstanding this, there is no mine which offers even half a security, and several mishaps caused by cavings have already occurred.

TREATMENT OF THE ORE—The mineral after being extracted from the mine is submitted first to a roasting, or, better yet, a crude melting; for this the natives open in the ground a hole one cuarta in diameter by two or three fingers deep, which they cover with some thin sticks forming a gridiron, above which they place a small, compact heap of mineral, held down by a board or piece of tree; and they cover all with thin pine wood, leaving a protected hollow above the board. They ignite this at once, leaving it alone until it has consumed the wood and completely heated the sulphur of the mineral, which takes 2 or 3 hrs. The products are an impure mass of copper mixed with earthen substances and pieces of coal and scorias of quartz which offer the aspect of a breccia in which the cement has partly disappeared, converting it into a porous mass.

The copper matte then suffers a melting process for black copper, which they execute in the following manner: They make a hole six or eight fingers in diameter which they surround with stones forming a species of hearth or crucible, leaving an open space for the placing of a pipe connecting with a cylinder bellows. This consists of two cylinders made from a hollowed trunk of pine in which run pistons formed by blocks of wood dressed on their circumferences with dry herbs and chicken feathers, which are held down only by the bellows, so they work in the manner of springs against the interior surface of the cylinders. In the lower part there is a hole and in that they place a cane, closing the valve at the beginning of the stroke.

Having formed the oven in this manner they charge it with pine fuel, mixed copper and matte, and put the bellows in motion, taking care to add the fuel in proportion to its consumption, and to agitate little by little with a cane so the copper may fall to the bottom and be cleaned from the foreign substances with which it may be mixed. When they know that the copper has all united into one mass, which should take place after ten or fifteen minutes, they stop the bellows and take out the coal and scorias which overfloat the metallic bath, leaving it uncovered until it has hardened a little and acquired sufficient consistency so that it may be handled. The product is a cake of black copper of rough and broken surface full of earth and pieces of fuel.

This cake they place at once on a bonfire where they leave it 2 or 3 hrs., making it suffer a kind of roasting process which purifies it somewhat, and they afterwards melt it in the same furnace, placing it in a species of crucible or mold of refractory clay. At the end of this they put the crucible in the hole and over it they place the stone cover and surround it with fuel. They then force a blast, and after the copper is melted they uncover the bath, taking out all the impurities. They remove the crucible from the furnace, and later, when the mass has commenced to consolidate, they compress it with a stick. Finally they take from the crucible, bury it in ashes until it has cooled, and smooth its surface a little by striking it with a stone.

The copper obtained in this manner they sell partly in cakes to the Christian people in the lowlands, and partly dedicate to the manufacture of pots and boilers which the Igorots forge with stones; also making of the same metal bars, tongs, and small pipes for smoking.

There remains now to consider the deposit of copper of Mancayan from an industrial point of view. According to what we have already said, the operations practiced up to date are all very superficial, and we do not believe they authorize the fixing of an opinion with respect to their importance. We are only able to say that the copper deposits pertain to the class of irregular deposits, and that, like the study of the laws which follow the distribution of the mineral, they demand a more mature examination and other methods of observation than the very limited ones which we have been able to make. Interesting above all is the inquiry as to whether the mineral penetrates to the interior of the mountain Aban, and whether the discovered masses in its declivities are only indications of concentrates of greater importance; and we believe that that already discovered is sufficient to justify a determination of this point. For this purpose there could be opened a gallery toward the interior of the mountain which could follow the direction of some of the masses to-day in exploitation, and afterwards there could be opened other galleries branching from the first in a perpendicular direction.

Furthermore, this deposit, by reason of its very irregularity, offers itself better to a system of irregular exploitation than to an arranged plan of operations. To undertake this there must first be expenses of some consideration in preparatory work, which besides their costliness will have to be of slow execution owing to the hardness of the rock. Nor should there be disregarded the topographical position of the territory of Mancayan, and the primitive state of its inhabitants.

The report of Hernandez seems to have awakened considerable interest in public opinion, and the government took steps to improve the output and methods of mining, requesting information from the engineer. The latter recommended several small improvements, and, with the caustic comment from his chief, that "all the instructions and regulations that could be given are utterly useless as being beyond the knowledge and intelligence of the Igorots, and even beyond that of the persons who have requested that they be communicated to the Igorots," Hernandez's connection with the mines ceased.

From the date of this report (1850) several years elapsed before the copper district was brought before the public. Then, in 1856, Señor T. Balbas y Castro, made application for the demarcation of the properties. He presents an agreement made in March, 1865, with—

The infidels, Tibaldo, gobernadorcillo of the rancheria of Mancayan; Mendoza, principal man of the rancheria of Tubo; Lancungan, principal man of Balili; Bayaque, of Bata; Tambana, of Bulalacao; Paduan, of Talbac; and Bagnaqan, of Pat Pat (and others), * * * who, of their own free will and accord, without the mediaton of either physical or moral compulsion, deception, or fraud, but because they are persuaded of the advantages that are to be attained; after having conference with their subjects, and in conformity with these, they have agreed in abandoning * * * the right they may have to the mountains which form the fissure through which runs the small river of Magamba, which washes the entire deposit of the metal, * * * with the condition that these shall be respected and no work done in the interior of the small caves or mines which each rancheria has in exploitation from time immemorial,

For this concession was paid the sum of 500 pesos (about $200) and the natives were guaranteed employment in the mines at regular fixed rates. This agreement was approved by the government and a stock company was formed under the leadership of Señor Balbas, which proceeded to open the mines, two pertenencias of 83,000 square meters each, under the Spanish law, being laid out, and preliminary work being commenced in the same year.

PRODUCTION.—While but few figures of the production of these workings are available, those at hand may be worthy of record, and are here given:—Before the Cantabro-Filipino Company took hold of these workings, it is estimated that from 1840 to 1855, during 15 yrs., 40,250 lbs. of copper were produced, in the form of cakes or made up in various ways, per year, or a total of approximately 600,000 lbs. of metal, at a value of 26 pesos per pico, amounting to 117,000 pesos.

The year 1860 marks the first actual production, and in 1860 and 1861, 146,470 *arrobas* (of 25 lbs.) of mineral were produced, the greatest yield being from the crushers—that is, 64,688 *arrobas*—with an average content of 5 per cent copper; screenings, giving 9 per cent metal, yielded 9,608 *arrobas*; and the production of the first and second class mineral, containing 29 and 15½ per cent copper, was 2,380 and 29,201 *arrobas*, respectively. The rest of the mineral consisted of mixed ores, from various localities, to about 2,200 tons in all.

In 1862, 145,000 *arrobas* of mineral were produced, or about 1,800 tons; in 1863, 170,000 *arrobas*, or about 2,200 tons; in 1864, 180,000 *arrobas*, or about 2,500 tons; giving a total of 666,470 *arrobas* up to the end of 1864, or approximately 8,500 tons of mineral.

Further production was, 1866:—

Product.	Copper.	Amount produced	Content in metal
	Per cent.	*Pounds.*	*Pounds.*
First class	38	7,650	2,907
Second class	20	288 302	57,072
Various, making a total of	....	2,509,175	234,807

No further figures are available to show the amount of ore produced from these workings. From another place is taken the statement that up to 1874 there were produced by the Cantabro-Filipino Company 2,500,000 lbs. of copper as a result of its operations.

In 1875 the efforts of the Cantabro-Filipino Company came to an end and it suspended work. Santos, whom the Spanish Government had loaned to the company for a considerable period of time, died at the mines, and it is supposed that the cessation of the labors of this, their guiding spirit, contributed in no small degree to the reason for the closing down.

The smelter site and the mine openings remained as they were, and the natives and the Chinos for many years reaped a harvest from this ore, smelting and refining the product in a wonderfully skillful manner. Various projects to reopen the mines came to nothing, and finally in 1898 occurred the war with Spain. In the American Army, and especially among the volunteers, which were principally Western regiments, there were many men who had spent long years in prospecting and mining in other regions, and it was not long before the localities in the Philippines reported ore bearing became known; so that it was the most natural thing in the world for those hardy men to penetrate into this and other portions of the Islands in search of mineral, even when the country was, to say the least, dangerous, as many a sharp conflict showed.

Early in 1900, in January, a party of Americans, eight in number, reached Mancayan, and saw, as they could not fail to do, the rich copper ores of the old mines. Claims were promptly located, and as their knowledge of the district increased, the ground farther S. to Suyoc was examined and located. A month later another party came in, to be followed only a few weeks later by another. This made the district well populated in comparison to its former status, and, according to the Western (United States) customs, a *mining district* was formed and rules drawn up, even though no one knew what mining laws would prevail. For this and other reasons, owing to the unsettled nature of the Islands and its people, but little was done toward exploitation for a year or more. When the laws were promulgated and the attention of those willing and able to help was attracted, development was started in earnest, under the severe conditions which prevail. The future of this and other districts of the Islands will have much to be grateful for—to the courage and skill with which these pioneers (no less so because of a warm climate, and in modern times) forced their way and opened a way for others to follow.

CHAPTER III.

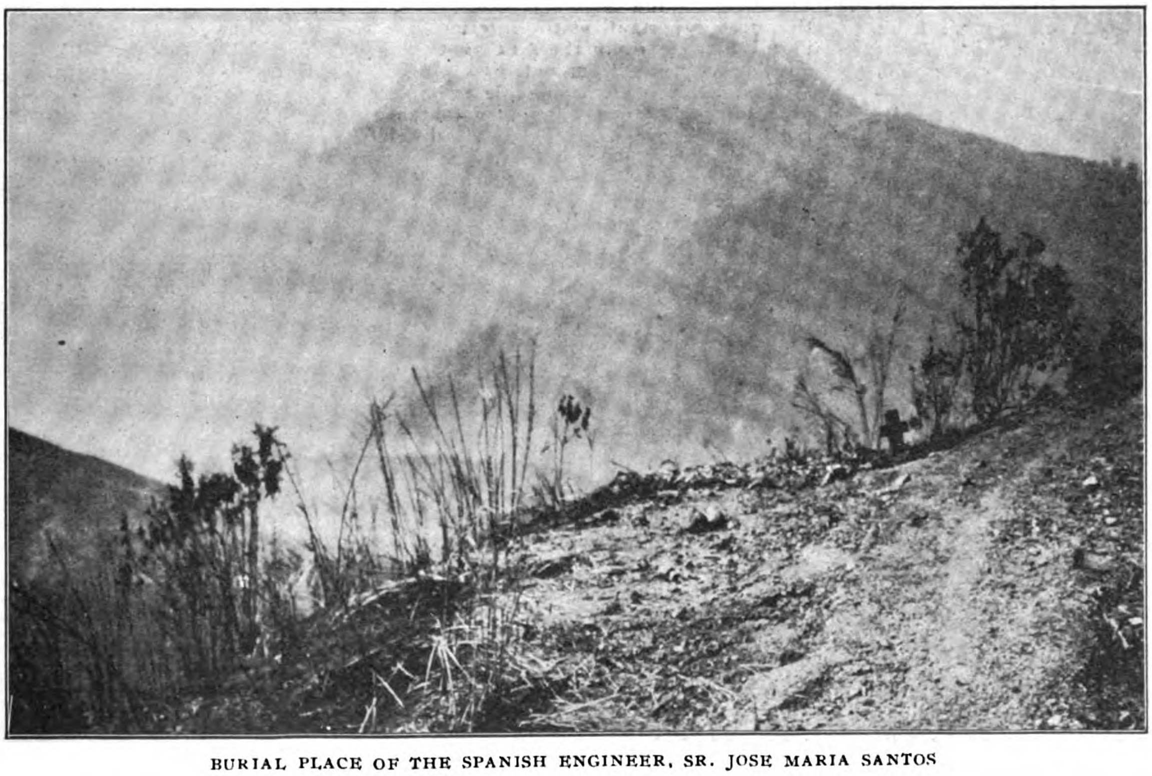
GEOGRAPHY.—The Lepanto copper area or that of Mancayan, the most important district, lies almost directly N. of Manila, the barrio of Mancayan being in latitude 16° 53′ N. (determined in the field) and approximately the same longitude as Manila. The latitude and longitude of Mount Datá, which is only a few miles to the E. of Mancayan, is given by the Spanish authors as latitude 16° 57′ and longitude 120° 55′ W.; and of Cervantes, the capital of Lepanto Province, from the same sources, latitude 17° 01′ 10″ N. and longitude 120° 50′ 30″ E. approximately.

The region as a whole is in the extreme southern end of Lepanto, on the western slope of Datá, the latter a noteworthy eminence among the lesser peaks of the Cordillera de Solis. Datá, the divide between Benguet and Lepanto, and the Malaya Range form a rough basin, in which the Abra River has its origin, and on the western and northern borders of this basin the mineral-bearing ground has been exploited.

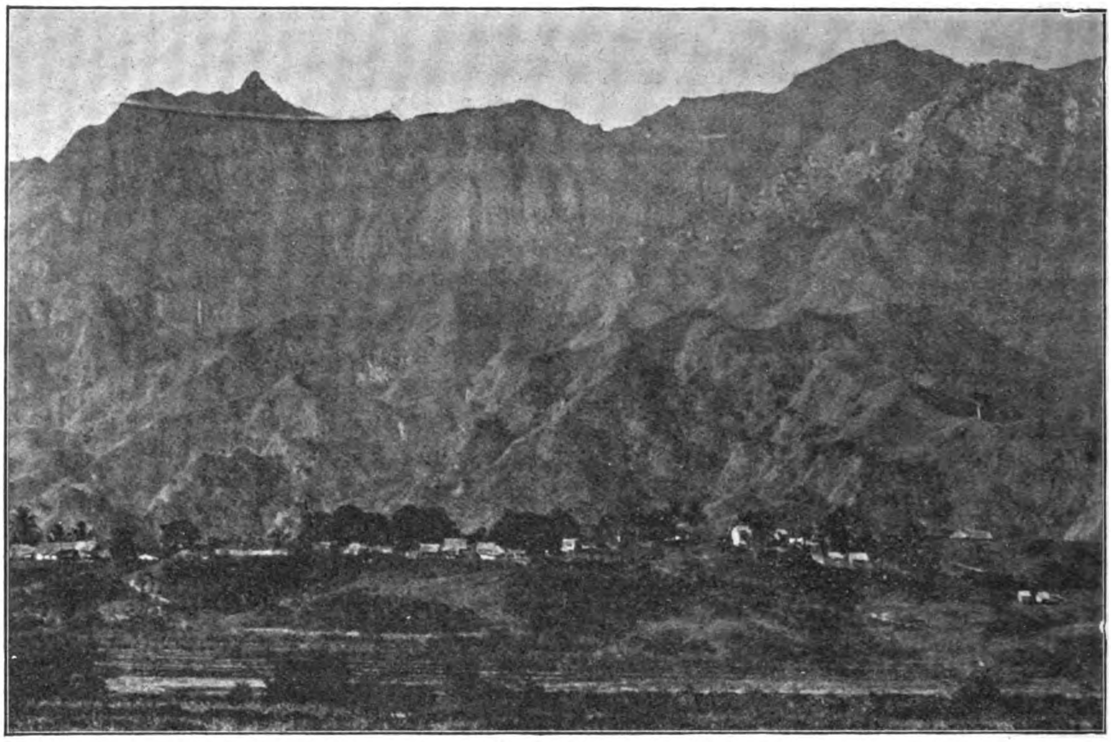
To the S. lies the northward-reaching angle of Benguet and the valley of the Agno River; on the E. Datá separates Lepanto from the Asin Valley; on W. is the Malaya Range, with the valley of the Abra.

The scene of the most active work is centered at the barrios of Mancayan and Suyoc, and in their immediate vicinity. From Cervantes south to Mancayan is by direct line a trifle over 9 ms. the trail with its windings bringing this distance up to between 12 and 13 ms. (about 10 kilometers). From Mancayan SE. to Suyoc is a little less than 4 ms. (6 kilometers) by air line, the divide between the provinces of Lepanto and Benguet being a mile or so farther S. The exploration and development of the copper and gold deposits have been undertaken several miles S. of Suyoc and for a mile or more N. of Mancayan, in a belt of varying width—at its widest a mile or two—this giving an area under actual attention of 7 ms. in length by 2 in width — 14 sq. ms. (35 square kilometers).

There are at present two routes to the district. The northern route, from Candon on the coast, *via* Salcedo, Concepcion, Teila Pass, Angaqui, and Cervantes, is a horse trail which during the dry season is in good condition. Its difficulties consist of the steep ascent and descent of Teila Pass, and the amount of fording necessary between Salcedo and Concepcion, 13 crossings of the river being necessary. In the rainy season the muddy condition of the trail from Candon to Salcedo, the flooded condition of the Balidbid River between Salcedo and Concepcion, and the destruction of the trail beyond practically closes this route. Another trail, a few miles to the N. from Angaqui to Santa Maria is an alternative evil. There is contemplated a new trail from Cervantes directly across the Malaya Range, down the Chico River to Tagudín, which it is believed will relieve



BURIAL PLACE OF THE SPANISH ENGINEER, SR. JOSE MARIA SANTOS



TEILA PASS

the present conditions. This trail will shorten the journey from the coast to Cervantes and it is believed will be available during the rainy season.

The trail to the S., to Baguio, is a good horse trail, but also has the disadvantages of the numerous fords which characterize all island travel. Baguio may be reached in from three to six days, passing *via* Bugias, Kabayan, Adoway, Daklán Ambukláo, and Trinidad, and from Baguio or Trinidad two days more are necessary to reach San Fernando on the coast. At this writing there is completed, or at least open to travel, the new Benguet road—a graded carriage road from Baguio to Dagupan, the northern terminus of the railway.

The most available route, therefore, is at present by the northern trail, subject to delays and mishaps in the rainy season.

In the mineral district the main trail from Cervantes, Lepanto, to Benguet passes directly through Mancayan and ½ m. E. of Suyoc. Another well-kept trail leads eastward from Mancayan into the basin on the W. flank of Datá known as Balili, about 3 ms. Apart from these, there are no trails other than those of Igorot construction. These trails—footpaths over which the Igorots trudge contentedly over impossible grades in single file—form connecting links between all barrios, and are found on every ridge; while they give fair communication among the natives, they offer no solution of the transportation problem.

CLIMATE.—No meteorological data are available for the Province of Lepanto alone, but it may be said that, in common with the whole Philippine group, generally only two seasons are recognizable, the wet and the dry. From November to April the climate of Lepanto leaves little to be desired. At this time of year clear weather predominates, only the occasional mountain showers breaking the long dry season.

At the altitude of Mancayan—the highest knoll in the village being little short of 4.000′—the temperature is comparatively low, blankets being comfortable if not actually necessary at night, and on the upper slopes of the southern end of the Malaya Range it is affirmed that the vegetation is killed at periods by low temperature. On good authority it is stated that actual frost has occurred. As late as July (in 1904) it is a fact that three natives died of cold and exhaustion while crossing the Malaya Range at about the same altitude as Mancayan. The mean annual temperature (for Manila) is between 26° and 27° C. (approximately 80° F.). These figures are considerably lower in Lepanto. In general, April, May, and June are the hottest months, followed by the steady rains of the period up to October and November, the entire rainy season coming between the months of May and October.

VEGETATION AND TIMBER.—As in all tropical areas, the native vegetation of Lepanto is heavy and luxuriant. The slopes are heavily covered with a growth of tree ferns, canes, grasses, and small brush, and it is only on the top of ridges that clear spaces are met. The grass of the region is a long, tough, and rank-growing variety, which, unless kept down by burning off, is not particularly good for fodder. The various varieties of cane find a multitude of uses—woven in a variety of ways for almost all conceivable purposes and for construction and clothing. Of the canes the true rattan or bejuco is not found to a large extent in this section of Lepanto. These two of the smaller growths are by far the most important, as the intermediate and useful bamboo is, in the area, not found in any but very small amount.

Of timber proper the notable examples are pine and oak. It may be noted that, according to the older residents of the district, at one time the valley of the Abra River and the adjacent slopes supported a heavy growth of pine and narra (*Plerocarpus indicus*, Willd). At present there is hardly a stick of timber in the entire region within a radius of 10 ms. of Cervantes. On the lower slopes, near the cultivated land, no timber whatever occurs, and it is only on the more inaccessible portions of the Cordillera del Malaya and the upper portion of Mount Datá that anything like good timber exists. The valley is but another instance of the shortsighted policy of destruction of forests when proper care is not taken, and without the slightest doubt the absence of retaining timber over this drainage area has a considerable effect on the run-off and the condition of the rivers in the flood seasons. Much of this timber was consumed by the smelters of the Cantabro-Filipino Company in their operations, and at present a demand for timber would necessitate a 2 or 3 ms. haul for a small amount, and if heavy demand were made on the forests for such purposes as fuel a considerably greater distance would have to be reckoned upon. The pine growth is of good size, clear and straight, up to about 2′ (diameter) sticks. On certain portions of the higher ridges a moderate oak growth is met. This latter is heavier S. of the mineral region, in Benguet Province, but, in necessity, fairly accessible.

AGRICULTURAL.—Aside from the timber products, and the natural wild growth common to all tropical regions, Lepanto offers along certain agricultural lines considerable opportunity for development.

In all portions several varieties of the banana are plentiful, serving as a food product. The coffee, especially in the higher regions (above 3,000′), is of most excellent quality, and at one time large areas were under cultivation that are now given over to grass. Cacao has been tried and successfully cultivated to a considerable extent. Sugar cane on the lower portions of the area, such as the flat at Comillas, yielded in past times exceptionally good returns; and the staple product, rice, reigns supreme. The labor and care given to this particular crop by the Igorots is something prodigious, in the construction of the paddies alone. Terraces to heights of 1,000′ to 1,500′ are not uncommon, and flumes, sluices, and dams are everywhere in evidence. The bulk of the product that is not consumed on the ground is not shipped out to the coast for export, but, on the contrary, into the interior to less fortunately situated peoples. The entire valley of the Mancayan River, as well as the Abra and its other tributaries, is flanked by rice paddies. No estimate has ever been made of the value of the crop annually, but from the number of hogs, dogs, and other merchandise sold by the traders from the coast, the figures must be of large proportion. The camote (a variety of sweet potato) is even more invariably cultivated, as it is the principal article of food. It grows rapidly, bears throughout the year, and requires but little care, conditions perfectly in accord with the ideas of the Igorot.

The natives—that is, the women and children—are engaged in the cultivation of the rice and other crops. The male Igorot does but little manual labor, the cultivation of the camote patches upon which the family depends for food, the rice fields, and other crops being left to the labors of women and children. The resemblance to the American Indian in this respect is striking, the position of head of the family and the state of proprietorship of any cattle or lands he may possess being evidently sufficiently arduous labor for the Igorot. Apart from the occasional mining and smelting done by him, there is little regular industry. The mining in the wet season, the cultivation of the crops, and the care of cattle are the chief employments.

POPULATION.—Within this district lies the large town of Cervantes, the capital of the province, which is the only considerable gathering of population in a town. Others, such as Mancayan to the S. of Cervantes, have but little of a collected population. In the total, the number of inhabitants of the district is not inconsiderable, but a view of the country reveals no villages of any size.

The tendency of the Igorot is to collect in groups of at most a score of huts, far up on some almost inaccessible ridge, and to avoid anything like a large village. Within a radius of a mile or two of Cervantes, Mancayan, Suyoc, and Cayan may be encountered numerous small barrios, which bring the population of the province up to 72,750. Cervantes proper has a population of 1,437 civilized, but with its outlying barrios the population, as given in the Gazetteer of the Philippine Islands from the census of 1887, is 16,000.

Similarly in the village of Mancayan are, according to the census of 1903, 118 civilized inhabitants, but its total population is about 1,500. The total population, almost wholly wild, of Suyoc is 600.

GOVERNMENT.—The present system of government places directly in charge of the province and answering to the civil government of the Islands a governor, a supervisor or engineer, a treasurer, and a secretary. These unite as a provincial board and decide as a whole the work to be done. In the various subdivisions are native presidentes (or headmen) and their consejales (or aldermen), and purely local affairs are directed by these, subject to central supervision and command. A group of old men in each smaller village have tacit powers, and it is one of the good points in the Igorot make up that their word has such great weight.

While it is hardly within the province of this report to enter deeply into racial characteristics, a very few words as to the nature of the inhabitants of these mining districts may not be out of place.

The Igorot is somewhat sharply distinct from the other races of the Islands. He is supposed to be derived from the races of the Malay invasion which were driven inland by the later invasion from the same region. He is a sturdy savage, generally happy and content, of considerable intelligence and good disposition; from a racial standpoint, moral and honorable. He takes not kindly to labor, not from the inherent mistaken idea of the Tagal, who despises work as degrading, but from the fact that he is of the mountain, free and untrammeled, and much labor is not necessary to his existence. He is more hardy than his brother of the coasts and plains, and as further more inaccessible portions of the island are reached many fine specimens of men and women are seen.

In religion his ideas are crude and have more or less of an oriental tinge—in fact, a mixture of the Shintoism of Japan with the belief of the North American Indian could not be far from the religion of the Igorot. Crude as the belief may appear to Christians, it is nevertheless a religion, a belief in a spiritual authority. The respect and deference accorded to the old men has been already commented upon; the Igorot feels a moral obligation to care for his aged that is rarely exceeded.

In advancement the Igorot is a curious mingling of the most ancient and the quite modern. The agricultural implements in use are the most primitive of iron instruments, and the pointed stick is in common use. The flint-and-steel method of making fire is used in certain parts of the province, and in others the *fire gun*—a tight-fitting piston in a barrel heating the compressed air—is the means used. In his copper smelting the process used is extraordinarily in accordance with modern practice, and yet in casting objects of gold, bronze, or copper the *cire perdue* process is used, a method which is also practiced by the Burmese bell founders, and which has come down from the Bronze Age. The use of a blast cylinder is common, superseding blowing by mouth, or a bellows; the pan for washing gold is of superior pattern; and the native has progressed far enough in construction to build an arch, though a *false arch*, formed by courses of stones projecting inward, one course above another, and not the more advanced type, the "true arch," of the keystone; and yet the Igorot has faith in the trial by ordeal and reckons the passing of time by the height of the sun and longer periods by the recurrence of the moon, and by the number of harvests.

(To be continued.)

RAILWAYS OF KOREA

The Seoul-Wiju Railway was opened to the public for general traffic December 1st, 1905. With a few breaks at the larger streams, trains were run through from New Wiju, the northern, to Yongsan, the southern, terminus as early as April. The Japanese, in 13 mos., had constructed 310 ms. of line. Immediately after the declaration of war they had commenced their work, using for some distance the embankments and culverts which the Franco-Korean Company, after several years of sporadic effort, has constructed near Seoul.

Yongsan, a small village on the banks of the River Han, 2 ms. SW. of Seoul, is the future railway center of Korea, and here 165 acres of land have been set aside as a railway reservation. The line from Wiju and the new road to Gensan, the principal port on the E. coast, starts from Yongsan, while the Seoul-Fusan and the Seoul-Chemulpo roads join with the above for through connection with any of the termini, the trains of all four running into the capital on common tracks. Strategically this place is of great importance, and the military authorities have condemned a large area in addition to that occupied by the railroad, which they will use for part of their army of occupation.

It is hoped to run a broad-gauge road over the route followed by the military line from Antung to Fengwhangcheng and beyond, and to bridge the Yalu at a point above that place. With tracks laid from Antung to Mukden the railway in N. Korea will become a section of the great trunk route. From a desire to introduce foreign capital the government will probably either establish a railway bureau for Manchuria and Korea, or by organizing a company strictly under its control, as, for example, the China Eastern Railway Company under the Russians, and put it on a commercial basis.

The military railroads are under the direct control of the general headquarters at Tokyo, and Major-General Yamane, who has been in charge of the work since the outbreak of the war, is not responsible to the commander in chief of the forces in Korea. The expenses of railroad construction have been met by appropriations from the war funds, the cost of materials and the rolling stock purchased abroad being paid at Tokyo, and the expenditures for labor and materials purchased locally, disbursed by the railway headquarters at Chemulpo. There are 2,863 railway employees, exclusive of contract laborers, a small proportion being military men and the great majority civilians from the Japanese department of communications. The latter, for their special service in Korea, are granted 40 per cent of their regular salaries as additional pay and are fed and housed. Coolies and workmen sent from the imperial railway bureau receive 60 per cent more than their ordinary pay and are given board and lodging. The officials are quartered in the station buildings, which are well constructed of wood, the coolies in iron-roofed barracks with white, plastered walls. The quarters are uniformly clean and well kept. A number of Koreans are employed as assistants in the stations and as interpreters, and a school has been established at Chemulpo to instruct the more promising in the rudiments of railroading.

The total cost of the road to date is roughly estimated at $15,000,000 gold, and it is said that an additional $10,000,000 and 4 yrs.' work will be required to put the line into final shape. The tracks follow the old Peking Road, which, with the exception of a stretch in Wanghaido, runs near the coast from Seoul to the Yalu, through a country generally flat. Where there is at present only one tunnel 557′ long there will eventually be eighteen, with a total length of 18,860′.

The standard gauge, 4′ 8½″, has been used for the Seoul-Wiju and Seoul-Gensan as for other railroads in Korea, and this fact furnishes a striking example of the general introduction of American methods and materials where once a footing has been secured. The American Trading Company building the first railway in Korea in 1897-1899 used the American gauge, American engines, and American cars and materials throughout. The Japanese bought out the original concessionaires and, to insure uniformity, built on the same lines. Of the 60-lb. rails used, some came from Krupp, but principally from the Carnegie works. The ties came largely from America and the spikes from the Illinois Steel Company.

The bridges are at present mostly of wood and built on piles. Their total length is 44,800′, the longest being 2,785′. In the temporary structures the longest span is 70′, which will be extended to 200′ when the final piers are completed. The construction has been exceedingly difficult on account of the shifting bottoms, the swift currents, the frozen streams in winter, the ice floes in spring, and the summer floods. The greatest obstacles were encountered near Anju, where two rivers—the Chingchong and the Tairyong—meet. The plan to cross the river below the juncture of the two proved impracticable and necessitated the bridging of both at a point 4 ms. above the place originally selected. Bridge materials are largely American—from the Carnegie Steel Company—although the Cleveland Bridge Company, of England, furnished a certain number of plates and girders, and the Osaka Steel Company also supplied a small proportion, using, however, material furnished by Carnegie. Bricks for lining the tunnels, building culverts to replace the present wooden structures, bridge piers, and facings are baked at four points along the line.

There are 58 stations between Seoul and New Wiju, which is opposite Antung and 12 ms. downstream from the old Korean city of the same name. The largest is Songdo, the second city of Korea, and the center of the ginseng industry. Whangju, the old capital of Whanghaido; Pingyang, the great distributing center of N. Korea on the Taidong River; Anju, and Tyongju are located near the railroad.

The trains of two or three cars each are generally crowded with Koreans and Japanese. Large numbers of the latter, small merchants and laborers, are constantly passing to and from the north. They are herded into box cars or squat on the piles of freight—bath tubs, safes, car wheels, and other articles, nearly all of them destined for use by the railroad or for its employees. At present there are only two through trains a day between Pingyang and Seoul and Pinyang and Wiju, one north and the other S. bound. Both runs require about 12 hrs., averaging 15 ms. per hr., including the stops, which are not overlong, as might be expected. It is hoped ultimately to run six through trains a day. The rolling stock consists of 49 50-ton Baldwin locomotives, with 24″ stroke and 16″ cylinder; 316 (22-ton) freight cars, 200 of which were captured at Port Arthur and which have been refitted to suit the standard gauge, with a miscellaneous collection of wheels from five different American firms, the rest of the cars coming from the United States, together with 58 passenger coaches, with a capacity of 100 each.

Coal has hitherto been imported from Japan, but it is hoped that the mines in the neighborhood of Pingyang may be developed. One area now controlled by the Korean household department contains a semianthracite deposit which, although it crumbles a short time after it is mined, when made up in briquettes is considered suitable for steaming by using

a forced draft. The mines are easily accessible near the Taidong River. A bituminous-coal area is also reported near Wiju. Freight charges are made at the rate of 5 *sen* per ton per mile for goods shipped under "tonnage standard," and one-half sen per parcel per mile under the "parcels standard."

Water carriage to Chinnampo and Pingyang, on the other hand, is cheap and convenient. The trip from Chemulpo to the former port requires 18 hrs., the run up the river to Pingyang taking eight more hours. The rates to Chinnampo range from $1.75 for steerage to $7 for first-class and 40 cents to $1.25 more to Pingyang.

The advantage of sending cargo by water is apparent, as the rates from Chemulpo to Pingyang by steamer are about $3.60 per ton, while from Seoul to Pingyang by rail the cost is $4.07. It was expected that the railroad might be largely used during the winter, but it is now announced that the principal steamship lines will keep the port of Chinnampo open by means of ice breakers. Until the road from that port to Pingyang is completed, however, there should be a certain amount of trade borne by rail from Seoul, which otherwise would have to be carried by ponies to that city and the interior.

The Seoul-Gensan line was commenced in July, 1905, the survey having been completed in May of that year, and a few miles have now been constructed from either terminus. The road will be 130 ms. in length, and the construction difficulties will be greater than on the Seoul-Wiju road. There will be six tunnels, the longest 2 ms., but there are no large streams to be crossed. The estimated cost is $15,000,000 gold.

The Whangju-Kyeminpo road is 21 ms. in length, and was built for bringing railway material landed at Kyeminpo, on the Taidong River, into the interior. One train a day is run each way. The Pingyang-Chinnampo line has been surveyed, and it is hoped to begin work in the spring of 1906.

The country tapped by the Seoul-Wiju Railroad is rich in rice, beans, millet, and barley, and is capable of much greater production than at present. The principal gold mining districts are near Pingyang and Anju. Five great rivers, which run from E. to W. to debouch into the Yellow Sea, are the natural avenues of commerce, and will be used to an even greater extent when the present shipping facilities have been improved. The winter, however, closes all these streams, and while in the present stage of Korea's development there is no great activity during the cold months, yet the opportunities afforded by the railway may stimulate a traffic which has been undeveloped because of the lack of proper communications. Although by overcoming these difficulties the railroad may be of great value in opening the country, Korea's geographical position, her long coast line, and her many streams, particularly on the west coast, afford easy access to the interior, and it is by these water routes that the great trade of the future will be carried. This Japan recognized when, by the treaty of August, 1905, she secured for her nationals the privilege of navigating the inland waters of the peninsula. Trade in Korea consists chiefly in the exchange of native products, or the profits of the local sale thereof, for piece goods, kerosene, sugar, and other common articles of every-day necessity.

The Seoul-Chemulpo line now pays fairly well, largely because of the number of people carried, while the Seoul-Fusan road is not yet meeting expenses. The Koreans in many cases travel for pleasure. It is for them an amusement, and better accommodations must be provided than in China, where the coolies and merchants are herded together in box cars or open trucks, oblivious to discomfort, if by endurance they are able to increase the profits of the venture, which is invariably the object of their journey.

Japanese are now established in large numbers at all the important cities along the railroad and at the small places as well, and the number of immigrants is constantly increasing. The Koreans themselves are more prosperous than ever before, owing to the large expenditures by the Japanese forces, and it is probable that the natives will be better governed in the future and for the first time in many years able to profit by the results of their own industry. There are indications that the next few years will witness an unparalleled development and a transformation in the commercial conditions that have prevailed in the past.

JAPAN'S TIMBER INDUSTRY

Consul-General Miller, of Yokohama, makes an interesting report on the timber industry in Hakkaido Island, which is the northern island of Japan. He says that many of the samples he has seen are very attractive, susceptible to high polish, and are used in Japan for furniture and for interior finish in houses. For cars, furniture, and interior finish, the consul-general says, the oak, curly ash, bird's-eye maple, and other fancy woods are well suited. His report follows:—

The possibilities of the lumber business in this part of Japan was early recognized by the first foreigners coming to Hakodate, and as far back as 1862 Captain Blakiston, well known for his scientific works on the Island of Yezzo, arrived at Hakodate with the bark *Akindo* from England, having on board a complete sawmill plant, which was at once put into operation and the output of which was exported to Shanghai and other Chinese ports. In the course of a few years, however, all the timber in the vicinity of the town had been cut, and the opposition of the native officials made it impossible to obtain regular supply of timber for the mill, so that about 1868 Captain Blakiston disposed of his plant to some Japanese.

Notwithstanding the whole island was, and to a great extent is yet, covered with valuable forests, nothing was done to exploit these until about 10 yrs. ago, when a demand arose in China for railway sleepers, and in a few years there was seen the curious spectacle of huge oak trees, ash, maple, and other hard-wood trees, all valuable, being cut down and turned into railway sleepers and firewood. How much valuable timber has been and is still being wasted for this purpose it is impossible to compute, but the value of the sleepers exported from this island during 1904 was nearly-Y-2,000,000, and they contained over 100,000,000′ of timber, 80 per cent of which was hard wood. It is but fair to say that during the last 2 or 3 yrs. a reaction has set in against using the more valuable timber for this purpose. It is being realized that there are other markets for the same, and this, together with the rise in price as the cutting of timber is becoming more remote from the railroads that transport to the seaports, will no doubt in the course of time raise the price to a figure that it will no longer pay to use the better class of lumber for railway sleepers, etc.

The principal timber on the island is at present and always will be oak. The trees grow to a large size, but on account of the nature of the ground it is difficult to get out large pieces. The usual sizes are from 12 to 36″ square and from 8 to 30′ long. It is of excellent quality and will compare favorably with the best eastern oak in the United States. The next in importance is ash, of which there are about 12 different varieties, and 2 of which are specially sought for at present; one called by the Japanese *tamomoku*, a beautiful kind of curly ash, and another called *tamo chichimi*, which has a wavy grain, both of which are now used by railway car builders in Japan for panels, etc.

There are some 10 varieties of maple, one of which is a beautiful bird's-eye maple, known as *itaya-moku*, and another, with a flowery grain, known as *hana-itaya*. Following the maples in importance is a wood called *sen*, which is largely shipped to Tokyo, Yokohama, and other ports in S. Japan, where it is used in making foreign furniture, for which it is very well adapted, as it gives a good polish, does not warp, and is quite hard and lasts well. This wood and the ash before mentioned come in larger logs than any other on this island, running up to 48″ in square logs. *Katsura* is a specie of cedar, of which there are several kinds, one of which, red *katsura*, would be excellent for cigar boxes.

The foregoing are the principal woods on Hokkaido Island, and in regard to quantities it would be no trouble to get in square logs the following amounts *per annum*, the figures representing board-measure feet:

Oak, 5,000,000; ash, 1,500,000; maple *(hana ita)*, 500,000; *sen*, 1,500,000; *katsura*, 1,000,000; curly ash, 100,000; wavy ash, 100,000; bird's-eye maple, 100,000.

MOTOR BOAT OUSTS SAMPANS

A motor passenger boat has just been introduced in Hongkong. One of the features of the boat is its cheapness. An engineer from Australia, seeing the possibilities of the motor boat, decided to hire one for the conveyance of passengers from vessels in Hongkong Harbor to the landing stage. The journey in a sampan through a choppy sea, against a contrary wind, would try the patience of a saint, remarks the *Hongkong Telegraph*. To sit huddled up under an awning, surrounded by ropes and rigging, while the boat rose like a lark under each wave and sank like a piece of lead into every hollow, was enough to try any but the most experienced sailor's powers of fighting sea-sickness. And, besides, there was always the uncomfortable feeling that, should anything happen, and the boat be overturned, there was practically no chance of escape, for the ropes would entangle the occupant even if he managed to get free of the awning. Consequently, when the motor boat appeared, it was hailed as a boon and a blessing and secured much patronage, to the annoyances of the sampanmen. They determined to drive the motor boat off the harbor waters. So one night they played havoc with the propeller at Blake Pier. It took 2 hrs. to repair the propeller. Another time the motor was found to be useless until a lot of repair work had been done to it. And so on, the game went. Nights have been spent watching for those who thus object to motor boats. Not a single individual has been caught yet. But the sampan people have pronounced themselves the offenders by departing from their old anchorage at Blake Pier.

FRENCH INDO-CHINA INCREASING RAILWAY FACILITIES

In a report just published on the trade of Indo-China, Mr. G. W. Pearson, of the British Consular Service in China, says that the French Colony shows great progress, but from the difficulty of obtaining accurate statistics it is not easy to say how great is the progress and how much the cost to the home government. The country is now, he says, in a rapid process of transition from a land of agricultural industry to one of bustling industry. There are great natural resources, but the obstacles to development are great. There are two lines of tramways in Tongking, the first through Hanoi and its suburbs, and the second from Namgiang to Kesat; neither has been a commercial success. In Cochin-China there are four, all of which have been successes, namely, two from Saigon to Cholon, the third from Saigon to [?], the fourth from Saigon to Hoomon. In Annam a line from Tourane to Faifo is in course of construction. The railway lines in operation a year ago were 644 kilometres in length, of which 404 are worked by the government and the balance by the Compagnie de l'Indo-Chine et du Yunnan. On these lines the Chinese mechanics, firemen and stokers have been replaced by Annamese. The number of passengers carried by the railways in 1903 was over 2,000,000 and the freight 61,256 tons. The lines under construction last year were from Haiphong to Vietri, Hanoi to Vinh, Vietri to Laokai, Tourane to Hue, Saigon

to Kuanhoa and Saigon to Langbian. The most important of these, from the point of view of outsiders, is the Vietri-Laokai line, which is the chief artery of the lines intended to feed the Yunnan railway now under construction. The plans for the Laokai-Yunnan line were sanctioned in January, 1903. The route crosses the mountain ridges of Yunnan through the Namti valley, and, passing through the valleys of the Pataho and Tachenho, the principal branch of the West River and the outlet of the Tangzu lake, approaches Yunnan city via Amichou. This line will unite Tongking with the capital of Yunnan.

The new scheme of mail services contemplates doing away with the Marseilles-Australian and the Marseilles-Bombay service, and reducing gradually the subsidy on the Saigon-Shanghai line. A new line is to be substituted from Saigon to Sydney via Singapore, Batavia and Brisbane and another monthly service between Marseilles and Saigon. But Mr. Pearson thinks this impracticable and believes that the mail service must be a line of large carriers between Marseilles and China.

The most important coal mines in the colony are those of Hongay, where 3,000 workmen are employed. The output in 1904 was 230,980 tons, of which one-third was manufactured into briquettes. There are several other mines, but these are not of any great consequence at present. There are several metal mines, principally gold and tin, and prospecting is being vigorously carried on.

The average export of rice from Indo-China is about a million tons. Of the 976,410 tons exported in 1904, all but 94,379 tons came from Cochin-China, France, Japan, and the Philippines being the principal destinations. Many French colonists have been given concessions for the cultivation of rice, but hitherto they have met with little or no success. They attribute their failure to lack of labor, a cause which handicaps every project in Indo-China. Even when sufficient laborers are found, installed and given advances of money, they will suddenly disappear leaving the crops rotting for want of harvesting. Further, and here is a lesson for river engineers, the inundation of two districts, Vinhyen and Phuoyen, has done great damage. The inundation was caused by blunders on the part of the engineers who attempted to deliver Hanoi from all danger of inundation by cutting through existing dykes retaining the Red River; the result was that two years afterwards, in 1896, an inundation occurred, sweeping away the weakened dyke submerging the surrounding region and damaging the existing works of the Yunnan railway. Successive floods have since devastated the district.

The cultivation of tobacco has increased and a factory is now working at Hanoi. Sugar-cane is also cultivated, but it is not a favorite with the natives of Indo-China, as the crop demands more care and hard work than rice or maize.

Serious attempts are being made by the French Colonial Government to utilize large tracts of Indo-China as cattle stations, where breeding can take place on a large scale. At considerable expense herds of cows and horses are installed at various points and convict prisoners are employed to tend them under the charge of a French expert. Such a station is found at the Isle de la Table, a practically uninhabited island, twenty-five miles long in the Baie d'Along, where experiments in the production of cross-breeds suitable to the country are being carried out. The plains of Indo-China are covered with gramineous plants, as in Australia and Argentina, and the nature of the soil supplies rich pasturage. In the grass Andropogon, Tongking is, perhaps, the richest country in the world, and, therefore, should be able to afford excellent pasturage for sheep. The Erachne Chinensis is abundant on the driest hills, and yields an unfailing food. But, on the other hand, in the cultivated plains, the calcareous highlands, where the gramineous plants do not thrive, and in the abundant forests, cattle could not support themselves, and, therefore, the suitable area for pasturage is greatly restricted. It would appear that the best country for this purpose lies between Dong Trieu and the Chinese frontier, composed chiefly of unwooded hills, and in a strip of country stretching from Mi Luong between the Red and Black Rivers towards Hong Hoa.

MESSRS. SPEYER & CO. GET RAILWAYS

The banking firm of Messrs. Speyer & Co., of New York and London, who represent the majority holdings in the Manila Railway Company, Ltd., which operates the Manila & Dagupan Railroad and branches, have finally come to an agreement with the Washington Government and secured the concession to build other railway lines on the Island of Luzon. The Philippine Commission has awarded the contract and authorized the secretary of war to execute the details of the arrangement. Probably the most comprehensive and satisfactory explanation of the controversy between the bidders and the government, which has finally been settled, is given in the following excerpt from *The Cablenews* of Manila:—

The bid of Messrs. Speyer & Co. for the lines on Luzon, which was opened at Washington, January 21st, on general lines, was identical with their former bid which had been rejected in December, on account of not being in accordance with the specifications. It had been reworded so as to bring it within a strict interpretation of the law, yet contained several objectionable clauses, which, if agreed to, might have subjected the government to serious criticism.

Governor General Wright, Commissioner Forbes, and Railroad Expert Molitor went to New York and spent a whole day with Messrs. Speyer & Co. endeavoring to reach an agreement upon the form of concession, one that would be sufficiently attractive to enable the bankers to sell their bonds, and at the same time would not be yielding things which the government should retain in its own control. Of some 11 points of difference six were satisfactorily adjusted. Two while not adjusted did not seem of sufficient importance to keep the two parties apart; but on three points the government failed to get together with the bankers. These three points are understood to have been the power of the government over the rates to be charged, the question of taxation, and the prohibition of future competing lines.

The Speyers' January bid covered the 425 ms. of line they had originally offered to build without any guarantee of interest on the cost of construction, and in addition they agreed to build the whole of the line from Dagupan to Laoag, a distance of 163 ms., upon a guarantee of 4 per cent. Formerly they had only offered to build this line as far as San Fernando, Union, a distance of about 50 ms. This added materially to the merit of their proposition, giving the Islands that amount of additional mileage. This Laoag bid, however, was conditional upon the acceptance of their offer upon the other 425 ms.

On March 2d Secretary Taft held another conference with the Speyers and they submitted their final answer as to the concessions they were disposed to make meet the government's views. Later Governor-General Ide received a cable announcing that the negotiations were proceeding favorably.

In their bid the Speyer syndicate said:—

"Satisfactory concessions having been granted, we will commence surveys within 60 days after written demand for their commencement shall have been made to us by the governor-general, and we will endeavor to complete the surveys, so as to furnish the governor-general with the detailed reports and complete maps within 6 mos. after receipt of the said demand.

"Having regards to the uncertainty of labor conditions and to the difficulties of proceeding with construction work during the rainy season, we do not estimate that we can complete ready for operation more than 75 ms. of road each 12 mos. Should it be possible, however, to commence construction at the beginning of the dry season, and should we meet with favorable conditions during the progress of the work, we should expect to complete and have in operation 150 ms. at the end of the first 18 mos. This estimate would, of course, be subject to revision in the event of unforeseen labor difficulties, earthquakes, other action of the elements, rebellion or causes beyond our control."

The Speyer bid involved a total of 633 ms., 425 ms. of which would be new construction, and 208 ms. representing the present Manila Dagupan line and its branches. Under their bid line No. 1, which the government wished constructed from Dagupan to Laoag, in the Province of Ilocos Norte, would terminate at San Fernando in the Province of Union. Line No. 2., under the specifications calling for construction of line No. 3, from Dagupan or any neighboring point which shall have railroad connection with Manila, N. through the Caraballo pass and down the valley of the Cagayan River to Aparri, but because of the engineering difficulties, the consequent cost, and the unpromising traffic outlook, they would not construct the line at the present time.

Line No. 4., from Manila to Dagupan, the bidders consider unnecessary, as they propose to acquire the Manila & Dagupan Railroad. Their proposal contemplates slight deviations in several particulars, from the line officially known as No. 5 from Manila to Batangas. These deviations include a branch to Cavite. On line No. 6, in the Bicol provinces, the bid agrees substantially with the route as laid out, from Pasacao *via* Nueva Caceres to Batan and Legaspi.

There is yet a possibility that Baguio will eventually be reached direct from Manila without the necessity of a long and tedious trip over the Benguet Road. By the concession granted to the Speyer syndicate a road from Dagupan to Camp 1 has been called for but this would necessitate the making of the rest of the journey over the famous highway.

The survey made by the military authorities of the Province of Benguet makes a provision for a railroad over another route but starting from Dagupan, but there is another possible route leading up from a point several miles S. of Dagupan into the mountains on the E. of the Bued River, the bed of which is followed for the most part by the Benguet Road. The valley of the Agno River forms an easy ascent for railroad construction, and may eventually be used. This would take the line into Baguio by way of the military reservation.

Whether such a project will ever be presented to the Philippine Commission is as yet uncertain but as the insular government is anxious to have the summer capital put within easy reach of Manila for the benefit of all it is quite possible that in the near future the scheme will be formulated and Manilaites will then be able to get into the train at Manila in the evening and after a trip in the cool of the night be landed in Baguio in a few hours.

The commission, in session at Baguio, has agreed to extend the time for the completion of the Antipolo Railway and branches to December 31st, 1906. The Antipolo line is now completed as far as the Town of Taytay, which is but 4 ms. distant from the terminus. This last stretch of the road, however, presents great engineering difficulties, because of the roughness of the territory and the elevation of the Town of Antipolo, which is situated at an altitude of 800′ above sea level.

REJECTED ALL BIDS

Bids were opened recently in the office of the chief quartermaster, Department of Luzon, for the erection of 40 new bamboo and nipa buildings to be used as officers' quarters at Camp Stotsenburg. The bids were all too high and have been rejected. New bids will be advertised for in a day or two and a number of changes have been made in the plans. It is the desire of the government to limit the cost of each set of quarters to ₱500. The bids were as follows: O. F. Campbell, ₱1,189 each, ₱47,560 for all; Losaro Segoria, ₱1,420, each, ₱56,800; D. Velasco, all ₱131,022; B. W. Cadwallader, each ₱1,389, all ₱55,560; C. S. Choy all ₱57,850.

CHARCOAL INDUSTRY IN THE PHILIPPINE ISLANDS

In a pamphlet just issued from the Philippine Bureau of Forestry, Mr. William M. Maule, a government forester, gives an interesting description of the charcoal industry in the Philippine Islands, which, while not one of the most important of commercial enterprises, is kept alive by certain market demands which can not be filled from other sources.

The call for charcoal in Manila, which is the leading market, is somewhat limited, but steady. Large consumers are usually supplied by contract, while smaller users buy from the open market. Aside from the considerable quantity used in the provinces for laundry purposes and for smelting ore, which, in the aggregate, probably falls but little below that used in Manila, the more varied uses in the latter place are for laundry, tailor shops, hatters, restaurants, bakeries, and metalworkers.

During the fiscal year 1904-5 the total shipment of charcoal from the provinces to Manila was 5,116 cubic meters, of which quantity 3,984 cubic meters came from public lands and 1,182 cubic meters from private lands. The provinces which furnished this supply are Zambales, Pampanga, Bataan, Pangasinan, Mindoro, Laguna, Batangas, Tarlac, Bulacan, and Tayabas.

FILIPINO METHODS OF MAKING CHARCOAL.—The native methods of charcoal burning as pursued in Zambales and Pangasinan provinces may be taken as typical. The wood which is to be used, having been cut in 1-meter lengths, is piled on end about a central guide post or pole having the required height of the kiln, or about four wood lengths.

TYPES OF PHILIPPINE KILNS.

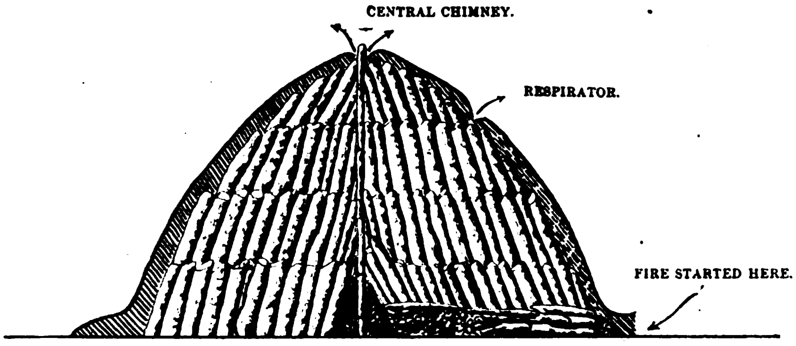


Fig. 1.—NATIVE KILN (GENERAL USE)

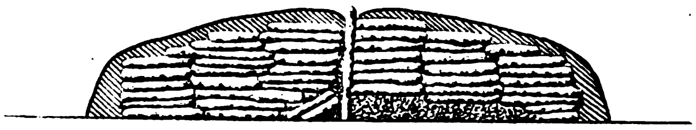


Fig. 2.—TYPE OF KILN, MASINLOC, ZAMBALES, P. I.

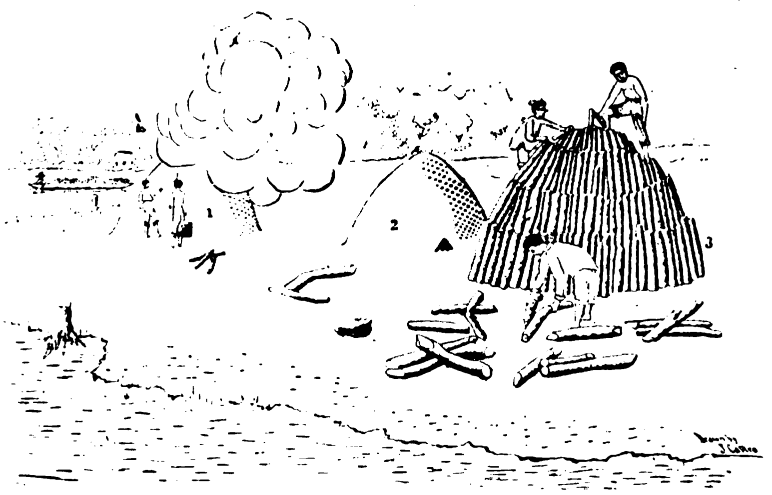


Fig. 3.—KILNS IN VARIOUS STAGES: *(1)* BURNING. *(2)* COMPLETE (BEFORE BURNING). *(3)* NEARING COMPLETION (NOT CAPPED).

Each tier decreases in diameter, and they finally converge to form a cone-shaped pile. *(Figs. 1 and 3.)*

There are no uniform dimensions in the kilns, but an average one will have a basal diameter of 2 meters by 3 in height.

In order to provide draft in burning, a small radial vent leads along the ground to the central axis, then upward to the apex of the cone. At the time of building, the lower portion of this chimney is filled with combustible materials—of the leaves or small dry branches.

At Masinloc certain burners employ another method of piling, whereby the wood is arranged in a horizontal radiating manner of from 2 to 3 concentric circles. *(Fig. 2.)* Kilns of this type are but slightly conical and are rarely more than 1 meter high. The same system of draft is given as that of former method. In either case, in order to complete the kiln, the surface is capped by a layer of clay or loam, and during burning is constantly moistened.

In starting the burning, a fire is placed at the lower vent, and, in order to distribute it properly, small openings are made on the surface of the cone. During the course of burning the fire works from below toward the openings above, and as carbonization of parts is complete, new drafts are made and old ones closed. Sufficient information is not at hand to show the comparative merits of the above methods, but as the former is more frequently used, it is no doubt preferable. One week is usually required to burn a kiln whose construction and burning require the services of three men for one week.

Waste—From a kiln whose volume is 12 cubic meters (which is an average size) the yield in charcoal never exceeds 9 cubic meters, the waste being divided between 1 cubic meter of partially carbonized wood and 2 cubic meters of ash. On an average but 7 cubic meters of charcoal are secured, and at times only 5.

The improperly carbonized wood is usually replaced in the following burning, thereby diminishing the waste.

Rarely is the oven protected by a roof, and in case of heavy rain the cap is washed off and the fire quenched.

From the upper Zambales coast charcoal is usually shipped by means of paraos, the owners of which buy either direct from the burners or secure a license and employ men under their supervision.

In the provinces charcoal is usually bought and sold by the *batulan* (Tag.), which is 1 cubic yard (Spanish) or 0.584 m/3. In general, the price paid per *batulán* in the provinces is from 2 to 3 pesetas (40 to 60 centavos, Philippine currency).

The foregoing methods are used in producing charcoal on a commercial scale. By a third method, which is applied only to making small quantities for household use, the wood is embedded in rice hulls or chaff and the mass fired. This method requires about two days to burn, after which the fire is extinguished by water—a method observed to be in general use in Pampanga.

JAPANESE METHOD.—In the vicinity of Subic, Zambales, and Moron, Bataan, several Japanese licensees have begun the manufacture of charcoal according to methods employed in Japan, and as such methods seem superior in many ways to those in general use, their introduction should meet with favor. Permanent kilns are constructed on a well-drained hillside, half the kilns being excavated from the bank, while the front, containing a door for filling, is built up from stone and clay. *(Fig. 4.)*

Having constructed the kiln, which, on an average, is slightly more than 1 meter deep and having a capacity of about 5 cubic meters, a chimney, with diameter of 3″, is placed at the rear, having its inner opening at the bottom of the kiln. By filling the unfinished kiln with wood and rounding off the top, a model is formed for the dome, which consists of a 6″ layer of clay. In burning this first kiln, the clay is baked, and, if of good quality and protected by roof, will last several years. Three small holes are made in the dome, which furnish draft.

In order to insure complete and even burning, the ground plan of the kiln is made pear-shaped, with the neck portion near the door. Such shape insures a better draft than where the plan is round. *(Fig. 6.)*

FILLING THE KILN.—In securing wood for burning, but little care is taken in selecting species, there being but few that are not suitable. Pieces are cut into lengths of height of kiln, and range from very small to 10″ in diameter, above which size they are split. The larger pieces are placed toward the center of the oven, and all are builded in as compactly

TYPE OF KILN AS MADE BY JAPANESE IN ZAMBALES PROVINCE, P. I.

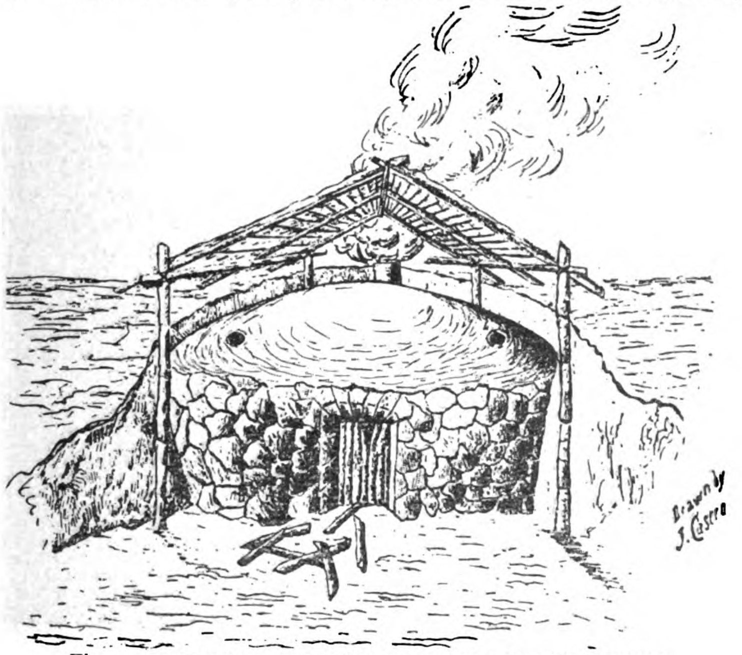


Fig. 4.—OVEN COMPLETE (CLAY DOME AND TWO VENTS)

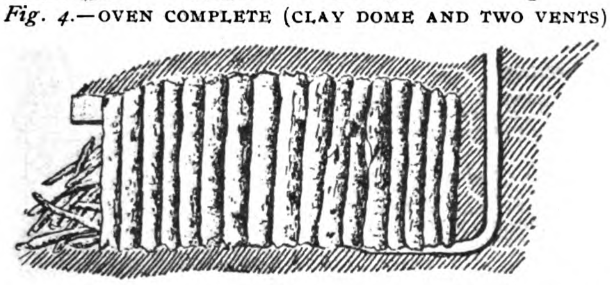


Fig. 5.—MEDIAL TRANSVERSE SECTION OF OVEN. DOOR ON LEFT AND CHIMNEY ON RIGHT FLAME STARTS UPWARD FROM DOOR, ALONG TOP, AND DOWN TO CHIMNEY

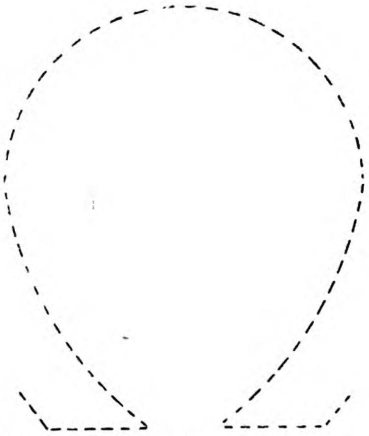


Fig. 6.—FLOOR PLAN OF KILN. (BY BEING PEAR-SHAPED, IT HAS BETTER DRAFT THAN IF CIRCULAR)

as possible by a man within. Having thus filled the kiln to the door, a small pile of dry wood is placed in front, from which the interior is fired.

BURNING.—After burning some 4 hrs. with all drafts open, or until about 4″ of red coals appear over the top of the corded wood within, the door is closed or builded shut, with the exception of a small vent below, by means of cross logs cemented with clay.

The fire, beginning at the top, works downward, as shown in fig. 5. In from 3 to 4 hrs. more, the fire being well distributed, the three small vents of the dome are closed by clay, leaving open only the small aperture at the bottom of the door and the chimney, by which further burning is regulated. The kiln requires frequent attention, to see that the fire is not too strong or too weak.

Three days are required to carbonize the wood, after which all vents are closed, in order to smather aut the fire, which requires an additional three days, so that, on an average, one week is required to produce one kiln of charcoal. On an average, three kilns are kept burning constantly, and require a crew of from 6 to 8 men and 1 foreman.

Product.—The charcoal comes from the kiln in excellent condition; rarely is there found any waste caused by under or over burning, and so perfect is the carbonization that the bark is not consumed. A kiln whose volume is 5 cubic meters will average 24 sacks of charcoal.

Volume of Kiln.—Five cubic meters contain 5.4 cubic meters of loosely piled wood and yield 4.30 cubic meters of charcoal, the approximate loss being 1 cubic meter. The foreman stated that a safe average of loss in burning would be 2/5.

In summing up the advantages of Japanese methods over those employed by the natives, we find the following:—

Kilns can be used repeatedly, with but little repair.

The burning is more easily regulated and results in less waste.

The product is not damaged by water, which is frequently used by natives in quenching the fire.

The charcoal comes out clearer than where the oven must be destroyed in removing it, and brings better prices.

In places where Japanese have been operating, the natives have adopted their methods, working at first under a Japanese foreman, or employing him, and, seeing the advantage gained, they will no doubt adopt it generally.

Profits, Japanese method.

Charcoal gang, 1 mo.:	
8 laborers, at ₱0.60 *per diem*	₱144.00
1 foreman, at ₱2 *per diem*	60.00
Freight on 350 sacks of charcoal to Manila (average monthly production), at ₱0.30 per sack, by steamer	105.00
Loading on steamer, at ₱0.05 per sack	17.50
Discharging steamer, at ₱0.05 per sack	17.50
Government charge, at 10 per cent market price (at kiln)	28.00
Combined expenses of making and shipping	372.00
Contract price in Manila, at ₱3 per sack	1,050.00
Profit of 1 mo.	678.00

No account has been made of initial cost of sacks, which average ₱0.15 each, and are used a number of times.

Heretofore the source of timber used in charcoal making has been taken from the mangrove swamps. In many places near Manila the best of these mangrove species are becoming rare or are of too small size to use in burning. In such cases species of the semi open forests or *parang* are selected, and in certain parts of Pampanga charcoal is made from *cauayan* (Bambusa), which has been planted for fuel purposes.

The following list includes species largely cut for charcoal.—

Mangrove.

Bacauan *(Brugiera).*
Tangal *(Rhizophora).*
Pagatpat *(Sonneratia pagatpat).*
Culasi *(Lumnitzera).*
Tibigi *(Xylocarpus).*
Dungon-late *(Heritiera littoralis).*

Semiopen or "Parang."

Agoho *(Casuarina equisetifolia).*
Binayuyo.
Guayabas *(Psidium guayava)* introduced sp.
Madrecacao *(Gliricidia masculata)* introduced sp.

MANAGEMENT OF FORESTS FOR CHARCOAL BURNERS.—The manufacture of charcoal from rees cut indiscriminately from the high forest, s usually undesirable from a sylvicultural, point of view, as clear cutting is generally practiced. In places where mangrove species have been exhausted, or where such do not exist, and where it is necessary that forest species be used, a simple plan of management can be devised whereby an "improvement cutting" can be made.

The forests in provinces adjacent to Manila are composed largely of 3d group species, many of which are important from a timber standpoint and can be lumbered profitably, owing to cheap rates of transportation. It is obvious that the reproduction of such species should be favored, with the view of timber producers.

Growing in association with these species are numerous 2d-story or even taller trees, which are generally of a hard character, but never attain merchantable size. Such trees will not only be valuable for charcoal purposes but their removal from the forest will promote the growth of younger stages of the merchantable species.

In carrying out such plans, a list of prohibited species should be furnished the licensee as pertinent to his cutting locality. Owing to the frequence of the above-mentioned species, it is believed that the adoption of this plan will not cause undue hardship to operators.

In order to show the importance of a safe and continuous supply of fuel, it may be of interest to state that the demand for fuel in certain of the Federated Malay States has assumed such proportions that a plan of management has been adopted for mangrove swamps.

FAR EASTERN ENGINEERING, CONSTRUCTION, COMMERCIAL AND FINANCIAL NEWS

RAILWAYS

CHINESE AMUR RAILWAY.—The Chinese Government has granted the application of the Tartar General of Amur Province for permission to construct a railway from Hulun to Tsitsihar and Aigun.

KAGOSHIMA RAILWAY, JAPAN.—Preparations are being made to resume construction work on the section of the Kagoshima Railway between Hitoyoshi and Yoshimatsu. This work was suspended during the late war.

RAILWAY SLEEPERS FOR CHINA.—A leading Chinese merchant in Sydney says there is a splendid market for Australian ironbark sleepers in China just now, where there are in course of construction and projected upwards of 50,000 ms. of railway lines.

SEOUL-GENSAN RAILWAY, KOREA.—Major-General Yamane, superintendent of military railways in Korea, has submitted to the resident-general a full plan for the construction of the Seoul-Gensan Railway. Work on the line will be started very soon.

NEW RAILWAY FOR MANCHURIA.—Representatives of the gentry and merchants of Kirin have recently been conferring with the Peking authorities concerning the construction of a railway between Kirin and Changchun. The government has agreed to contribute Tls. 800,000 towards the expenses.

LABOR TROUBLES IN YUNNAN.—The Governor of Kwangsi Province, China, reports to Peking that the French authorities have approached him in connection with the frequent desertions of the coolies employed on the construction of the Yunana Railway, and asked to prohibit this breach of contract. He states that he has informed the French that if the coolies are properly treated they will not desert.

RAILWAYS IN SHANSI, CHINA.—It has been finally decided by the gentry and people of Shansi to build the Tatung-fu and Pu-chou railways themselves without the aid of foreign capital. These railways will consist of three lines, as follows:—(1) From Tatung-fu to Kalgan, passing through Shio-ping-fu, Chi-hua-cheng, and Shuyuan-cheng; (2) from Pu-chou to Tung-kuan in Shensi, passing over the Yellow River; (3) from Ping-wang Tsechou, connecting with the Taokou-Tsechou Railway.

KOWLOON-CANTON RAILWAY.—The control of the British section of the Kowloon-Canton Railway has passed out of the hands of the Hongkong Public Works Department, and will be constructed under the direction of Mr. Graves William Eves, whose appointment as chief resident engineer-in-charge has been announced. The appointment was made by Sir Matthew Nathan, governor of Hongkong, under instructions from the Secretary of State for the Colonies.

CENTRAL-EASTERN RAILWAY OF JAPAN.—The construction train of this line is already running on the Shiojiri-Ohaya section of the Government Central-Eastern line. When this section is completed the connection of the Kobu Railway with the Shinohoi line will be effected. The construction of the Toyama-Naoyetsu Railway will be commenced this year. This work will take 8 yrs. to complete and will cost -Y-14,376,000, the work to be started from the Toyama end.

YUNNAN RAILWAY.—The French minister of the colonies has presented a bill to the president of the French Republic authorizing the government to take the necessary measures to complete the Laokay-Yunnan Railway to the capital of the Chinese Province of Yunnan. The reason for this is that the contractor who undertook to construct the line has found himself unable to proceed with the work owing to unexpectedly serious engineering difficulties and partly to the impossibility of obtaining labor. Experts will be appointed to report on the situation to the French Government.

PEKING-KALGAN RAILWAY, CHINA.—The chief engineer of this line, Taotai Chang-tien-yu, in making surveys of the railway, has found that the laying down of rails, the construction of bridges, the appropriation of land, the erection of stations and the boring of an 80 fathom tunnel through the Pa ta-ling Mountain, will cost altogether Tls.7,000,000. Last year, from the revenue derived from the Peking-Shanhaikuan Railway, Tls.1,000,000 were devoted to the construction of the Peking-Kalgan line. All those employed on the line, from the chief engineer to the commonest workman, are Chinese.

RAILWAY NATIONALIZATION, JAPAN.—The Railway Nationalization Bill, recently passed by the Japanese Diet, has been thoroughly amended by a special committee. The railways to be purchased have been reduced to those belonging to the following companies:—Hokkaido Colliery and Railway Company, Hokkaido Railway Company, Nippon Railway Company, Ganetsu Railway Company, Hokuetsu Railway Company, Kobu Railway Company, Sobu Railway Company, Boso Railway Company, Nanao Railway Company, Kansai Railway Company, Nishinari Railway Company, Sangu Railway Company, Kyoto Railway Company, Hankaku Railway Company, Sanyo Railway Company, Tokushima Railway Company, Kyushu Railway Company. The purchase is to be completed within 10 yrs., beginning with the current year, and the purchase money will all be paid in 5 yrs. after the date of taking over.

ELECTRIC LIGHTING, TRACTION POWER, ETC.

TOKYO-KOBE-MOJI TELEPHONE LINE.—This line, which has hitherto been used exclusively for military purposes, has been opened for public service.

STREET RAILWAY EXTENSION, TOKYO.—The Mihara-bashi-Horaibashi section of the Tokyo street railway, which prolongs the system from Tsukiji to Shimbashi, has been opened to traffic.

HANKAKU RAILWAY COMPANY, JAPAN.— A scheme proposed by the Hankaku Railway Company to lay a track of 20 ms., between Ikeda and Umena Station in Osaka, has been sanctioned by the government. The system will be converted into an electric line.

WIRELESS TELEGRAPHY, ZAMBOANGA, P. I.—The installation of the wireless telegraphy station at Zamboanga, Moro Province, is now about completed, and work will now begin on the erection of building and the installation of the apparatus for the station at Jolo, in the Sulu Archipelago.

HONGKONG ELECTRIC COMPANY, LTD.—At the recent annual meeting of the shareholders of this concern, the manager reported that the number of lamps, fans and motors connected with the company's supply service on April 1st was equivalent to upwards of 39,500 lamps of 8 candle power; 85 arc lamps are maintained by the company, and 20 electric lifts are being operated by the power service. The new chimney at the plant was completed and brought into service in September, while a shed has been constructed at the works to provide further accommodation for storage of material. The work of laying underground feeder and distribution cables from the works through the center of the city was completed in October. At the present date the main cables have all been laid and it is expected that the new distribution system will be brought into use about June 1st, when the various service cables, which are now being laid, will be connected up.

PUBLIC WORKS

BAGUIO-TRINIDAD ROAD, BENGUET, P. I.—A new road through the Trinidad Valley to Baguio has just been completed by the provincial government of Benguet, at a cost of but ₱4,300.

SEWER CONSTRUCTION, MANILA.—Major J. F. Case, M. Am. Soc. C. E., chief engineer of the sewer and waterworks construction in Manila, has submitted plans to the Municipal Board for the pumping stations to be erected in connection with the new sewer system of Manila.

MILITARY CANTONMENT, BAGUIO, P. I.—The residence of the commanding general of the Philippines Division and two other cottages have already been constructed on the military recuperation camp in the mountains of Benguet Province. Three other cottages are now in course of construction.

TOPOGRAPHICAL SURVEY, MANILA.—The city has made a topographical survey of Intramuros between Bagumbayan Drive and Calle Aduana, which has been united with the survey of the Malecon. This survey furnishes a rational basis for the improvement of the land between Bagumbayan and the city hall, and makes possible a scheme for the subdivision of the reclaimed area.

PROVINCIAL HIGHWAYS, PHILIPPINE ISLANDS.—The Philippine Commission has prepared a law soon to receive public discussion which includes a plan to improve the public roads of the Islands. The most important feature of the proposed act is the clause which makes it compulsory for every male inhabitant of the Philippines of 18 yrs. of age and under 55, with certain exemptions, to labor on the public highways, bridges, wharves or trails for five days of 8 hrs. each, every calendar year, or pay the equivalent in cash of such days' labor.

NEW BRITISH MILITARY WORKS, ETC.—*Colony of Hongkong and Weihaiwei*.—The British army estimates for the Far east for 1906-7 make the following estimates on new works in the Colony of Hongkong:—General service, including headquarters' offices, Army Service Corps stores, etc., £5,000. The total estimate for the work is under consideration. Married quarters, £5,000. The total estimate for the work is £7,000. Tramway from magazine to arsenal yard, £100. The total estimate for the work is £8,500, this having been raised from £8,200. Nine-tenths of the cost is to be borne by the Admiralty. Reconstruction of workshops and refitting stores handed over by the Admiralty, £1,040. The total estimate for this work is £2,290, the estimate being reduced from £5,000. To provide for a landing and shipping shed, £1,003. The total estimate for the work is £2,480. *Settlement of Singapore*.—Water supply at Blakin Mati, £2,000. The total estimate for the work is £8,500 (a provisional estimate. Accommodation for Ordnance Department, £660. The total estimate for the work is £54,180. The estimate has been reduced from £55,520, and £25,470 is to be repaid by the Admiralty.

PORT WORKS, DREDGING, DOCKS, ETC.

BIG DOCK PROJECT, JAPAN.—American, English and Belgian capitalists are reported to have finally arranged for the construction at Tanoura, near Moji, of a big dock capable of accommodating 20,000-ton steamers.

STAR FERRY WHARF, HONGKONG.—The new ferry wharf at Kowloon has been opened to business. It is a fine, massive structure, compared with the wharf it supercedes, and has separate compartments for first and second class travellers, besides being excellently lighted at night.

RIVER DYKES, TARLAC, P. I.—The Philippine Commission has appropriated ₱16,000 from the Congressional Relief Fund for the construction of dykes through the Pueblo of Tarlac, N. Luzon, in addition to ₱9,000 heretofore appropriated and raised by the province of Tarlac and the municipality.

YOKOHAMA HARBOR ACCOMMODATIONS.—The lower house of the Diet has approved of the government proposal to assist Yokohama in improving the harbor accommodations there. The government will undertake the work at the maximum cost of -Y-8,180,000 and the municipality must refund the outlay to the extent of -Y-2,700,000 to the government in the next 6 yrs. The city has to pay -Y-500,000 in each of the first 3 yrs. and -Y-400,000 in each of the succeeding 3 yrs. When the proposal is finally approved by the House of Peers, Yokohama will float a loan amounting to -Y-3,000,000.

FLOATING DOCK FOR KOBE.—It is announced that the Mitsu Bishi Kaisha is making arrangements for the construction of a great floating dock at Kobé capable of receiving vessels of over 10,000 tons. The company is desirous of making the dock sufficiently capacious to take steamers of the class of *Manchuria* or *Korea*, but it is not yet certain whether this will prove practicable. It has been decided, however, that the dock shall in any case be the largest in Japan, with the exception of the one belonging to the Mitsu Bishi at Nagasaki, which could take a vessel of upwards of 30,000 tons. The present intention is that the construction of the dock shall be commenced at Nagasaki shortly, and that it shall be completed and taken to Kobé by the spring of 1908. The existing floating dock at this port, which also belongs to the Mitsu Bishi, will not take vessels of more than 7,000 tons.

BRIDGES

AYALA BRIDGE, MANILA.—The Atlantic, Gulf and Pacific Company, of New York and Manila, has been granted an extension of time for 7 mos. in which to complete the reconstruction of the Ayala Bridge over the Pasig River.

SUSPENSION BRIDGE, MANILA.—City Engineer Dieck has recommended to the Municipal Board of Manila that the Suspension Bridge over the Pasig River be ordered entirely reconstructed or removed altogether. This bridge is private property.

MINES AND MINING

MINING INDUSTRY, KOREA.—The Korean Imperial Household Department has decided to work on its own account the different mines belonging to the department.

STOCKS OF COAL, WAKAMATSU, JAPAN.—At last report the stock of coal at Wakamatsu amounted to 250,000 tons and those at the collieries totalled 300,000 tons. These are the largest figures on record, and quotations of coal are therefore falling off.

TAKASHIMA COLLIERY DISASTER, JAPAN.—An explosion of fire-damp has done great damage to the Takashima coal mine, the property of the Mitsu Bishi Company, killing 307 persons, mostly miners. The walls separating one shaft from another were nearly totally destroyed by the explosion.

TIN EXPORTS, STRAITS SETTLEMENTS.—The total exports of tin from the Straits Settlements during 1905 amounted to 56,845 tons as compared with 57,560 tons in 1904. Of this total 31,488 tons were taken by the United Kingdom, 16,844 by the United States, and 8,512 tons by the continent in 1905.

FUCHUN COLLIERY, MANCHURIA.—Recent investigations show that the extent of the coal seam of the Fuchun Colliery, near Mukden, is 5 ms. in length, 144' in thickness, and about 1 m. in width. The total deposit of coal is estimated at about 250,000,000 tons. The daily output of coal at present is 2,000 tons.

BRITISH CONCESSIONS IN CHINA.—The British minister at Peking, Sir Ernest Satow, has repeatedly protested to the Waiwupu against the cancellation of mining concessions in the different provinces, which have been granted to British merchants. Lately he has revived his protests with vigor, but the Waiwupu has replied that unless a preliminary agreement has been ratified, it is not a valid document.

COAL IN MANCHURIA.—The coal mines in Manchuria are described by the Belgian consul at Tientsin. The Russians did not achieve success on the mines they opened at Yentai, and abandoned them in favor of the mines at Fuchun, E. of Mukden, on the Hung-Ho, which have been taken over by the Japanese and which Mr. Tanaka, director of the Bureau of Mines at Tokyo, states are very rich in coal. Their value has been estimated at $150,000,000 to $250,000,000 gold.

BRITISH AND KOREAN CORPORATION.—The last annual report of the British and Korean Corporation shows that the value of bullion obtained was £77,901 the result being a profit of £6,016. A new concession has been offered to the corporation on favorable terms in exchange for the Gwendo-line Concession and subject to the same conditions. Fresh capital will be required to develop the concession, and to that end it will probably be necessary to reconstruct the company.

BENGUET GOLD DEPOSITS, PHILIPPINE ISLANDS.—It is reported from Baguio, the summer capital of the Philippines, that during the past month another rich find of gold ore has been made in Benguet Province, Luzon. This discovery is located on the property of the Bua Mining Company at Antamok, near Baguio, and consists of a 4′ ledge of free-milling ore carrying $200 worth of gold to the ton. The property adjoins those of Messrs. Clarke, Clyde, Peterson and Kelly. Most of the capital of the Bua Mining is held by residents of Manila.

CHINESE IRON ORE TO JAPAN.—There is a very large export of iron ore from Shuweiyao to Japan. This port is situated on the Yangtsze about 80 ms. down the river from Hankow. The quantity of ore shipped last year amounted to over 90,000 tons. The mine itself is about 20 ms. from the river and is connected with the latter by a well-constructed railway. The ore is exceedingly rich and pans out from 60 to 75 per cent of iron of the very best quality. There are said to be millions of tons of this rich ore in sight, in addition to large quantities of limestone. The mine is worked by the Government of Hupeh under European supervision. The viceroy of the province has come forward with tangible proposals for mining laws, which, it is believed, will give a strong impetus to the mining industry in Hupeh by opening up other large fields as rich with ore as that near Shuweiyao.

INDIAN GOLD MINING RETURNS.—Following are the returns for the month of March last:—*Balaghat.*—4,400 tons of quartz crushed yielded 3,525 oz., and 2,750 tons of tailings cyanided yielded 249 oz., making a total of 3,774 oz. of gold. *Champion Reef.*—Milled 16,100 tons which produced 12,269 oz. and 14,934 tons of tailings treated by the cyanide process produced 2,191 oz., making a total production at 14,460 oz. of gold. *Mysore.*—15,700 tons of quartz crushed produced 15,004 oz., steamings from plates 620 oz. and 13,500 tons of tailings cyanided yielded 1,747 oz., making a total production of 17,371 oz. of gold. *Mysore West.*—Mill ran 702 hrs., crushed 1,493 tons and yielded 585 oz. bar gold cyanide 2,496 tons tailings treated yielded 166 oz. standard gold. *Hutti (Nizam's)*—830 oz. of gold from 2,100 tons quartz crushed and 275 oz. of gold from 2,000 tons of tailings cyanided, making a total production of 1,105 oz. estimated value Rs. 63,000. *Nundydroog.*—6,800 tons of quartz crushed yielded 5,314 oz. and 6,904 tons of tailings cyanided yielded 639 oz., making a total production of 5,953 oz. of gold. *Ooregum.*—Stuff crushed 10,267 tons gold produced 4,486 oz. and slimes and tailings cyanided 10,098 tons gold produced 1,140 oz., making a total return of 5,626 oz. of gold.

SHIPBUILDING, MARINE, ETC.

NEW JAPANESE ARMOURED CRUISER LAUNCHED.—The armoured cruiser *Ikoma* has been successfully launched from the Kure naval dockyard.

NIPPON YUSEN KAISHA EXTENSION.—This company will shortly open a steamship service to Bangkok, by extending its Hongkong line thither.

HONGKONG FOR REPAIRS.—Compañia Maritima's steamers *Neil Macleod*, *Aldecoa*, and *N. S. del Rosario* have gone to Hongkong to undergo a thorough overhauling and necessary repairs.

"CHUKONG" CHANGES ROUTE.—The river steamer *Chukong*, which has been employed on the Hongkong and West River service for some years, is now running between Amoy and Chinchua.

CHINA MERCHANTS' STEAM NAVIGATION COMPANY.—This company's steamer *Kiang Tung*, lately running on the Canton-Macao line, is to replace the steamer *Kuling* between Ichang and Hankow.

"JOSHIN-MARU" LAUNCHED.—*Joshin-maru* has been successfully launched from the Mitsu Bishi dockyard. She is of 1,200 tons' displacement and will be added to the fleet of the Osaka Shosen Kaisha.

NAVAL CONSTRUCTION, JAPAN.—The Mitsu Bishi shipyard has received orders for the construction of an auxiliary cruiser for the Imperial Volunteer Fleet of Japan. The tonnage of this vessel is some 3,000 and her speed will be 21 knots.

RUSSIA CHARTERS STEAMER "MONARCH."—The Russian Government has chartered the steamer *Monarch* (Messrs. Elder, Dempster & Co.), 7,355 tons register, for the repatriation of Russian troops from Vladivostock to Odessa, at the high monthly hire of £7,000.

SAILING SHIP "ALTA" DOCKED.—The American sailing ship *Alta*, which stranded in Manila Bay during a typhoon last year, and which was, after considerable difficulty refloated, is now undergoing repairs at the plant of the Kowloon Dock Company, Hongkong.

LAUNCH OF "LOONGWO."—The steamer *Loongwo*, building to the order of the Indo-China Steam Navigation Company for the Yangtsze River trade, has been launched by the Hongkong and Whampoa Dock Company. This is the second large river steamer *Kuling* built for this trade by the dock company.

"DRUMCRAIG" GIVEN UP AS LOST.—There seems to be little doubt now but that the big 4-mast bark *Drumcraig*, which sailed last September from Portland, Ore., to Manila with a full shipment of lumber for the B. W. Cadwallader Company, has been lost at sea. All hope for her safety has been abandoned.

NEW INDO-CHINA STEAMER.—Another addition to the fine fleet of Indo-China steamers, *Chip Shing*, has arrived at Hongkong from Cardiff *via* Singapore and Saigon. She is 1,199 tons registered, and has been built for the coastal trade. She was brought out by Captain Welgall, former master of the Manila steamer Loongsang.

IMPERIAL JAPANESE NAVY.—The results of the official trial trips of the two submarine vessels recently built at the Kawasaki dockyard, Kobe, have proved entirely satisfactory, and the second flotilla of submarine boats has now been commissioned. The Kawasaki management has been highly complimented on the thoroughness of its warship construction, by the Japanese Government.

PROGRESS OF THE FLOATING DOCK "DEWEY." The United States tug *Potomac* arrived at Malta recently from Gibraltar, and after taking on provisions proceeded to join the floating dock *Dewey*, 75 ms. off, which is on its way to the Philippines. The dock passed through the Suez Canal with little difficulty, and at last report was continuing its voyage at the rate of about four knots an hour.

PACIFIC MAIL'S SERVICE.—Messrs. Castle Bros.-Wolf & Sons, Manila agents of the Pacific Mail Steamship Company, have received a telegram from the head offices of the company in San Francisco to the effect that it is prepared to handle all passengers and freight at that end, as the earthquake did no damage to the company's terminals nor to railway facilities. The Pacific Mail will provide accommodations for all passengers until the departure of trains inland.

ARMY LIGHTERAGE, MANILA.—Proposals for furnishing lighterage for the Philippines Division have been opened by Colonel Patten, chief quartermaster. Following are the bids:—J. S. Michael, lorchas .04 cent per ton per day; E. D. Marcaido, cascoes .039 ct.; R. Soriano, lorchas .037 ct. and cascoes .035 ct.; L. Guison, lorchas .0367 ct. and cascoes .0325 ct.; M. T. Figueras, lorchas .036 ct. and cascoes .936 ct.; A. M. La Sala, lorchas .035 ct.; Faustino Lochauco, lorchas .032 and cascoes .035. The lowest bid on cascoes was that of L. Guison, and on lorchas that of A. M. La Sala.

INTERISLAND SHIPPING, PHILIPPINE ISLANDS.—The Philippine Commission has accepted the tenders of four of the bidders for the interisland shipping routes, the successful competitors being Compañia General de Tabacos de Filipinas for routes Nos. 1, 2, 3, 12 and 13; Compañia Maritima, routes, Nos. 1, 3, 5, 7, 9 and 11; the Manila Shipping and Transportation Company, part of route No. 8, and Messrs. Smith, Bell & Co. the other part of route No. 8. It is estimated that the net saving to the insular government on freight shipments will be about ₱18,000 a year. Freight rates for merchants will be from 18 to 20 per cent less than heretofore, and they will be under government supervision. Mails will be carried free.

TWIN-SCREW STEAMER "CYCLOPS."—The new twin-screw steamer *Cyclops*, built for the Ocean Steamship Company, Ltd., of Liverpool, has been launched from the shipbuilding yard of Messrs. David and William Henderson & Co., at Partick, Glasgow. She will ply in the Oriental trade. Her length over all is 500′; breadth (moulded), 58′; depth (moulded), 42′6″; and gross tonnage, about 9,000 tons. The machinery is being supplied by the builders, and consists of twin engines, each having cylinders 23″, 38 ½″, and 65″ in diameter and 48″ stroke, with three large boilers, worked on the owner's closed ashpit system of forced draught, for a working pressure of 190 lbs. per sq. in.

"TEUCER'S" MAIDEN VOYAGE.—The new Blue Funnel liner *Teucer* has arrived in the Far East on her maiden voyage. She is one of five similar vessels ordered by the Ocean Steamship Company, and is practically a sister ship of *Bellerophon*. The chief feature is that in these steamers masts have been entirely dispensed with, their place being taken by four pillars, arranged in pairs, fore and aft, to act as craneposts for derricks. *Teucer's* appliances permit of her handling weights up to 35 tons. The two forward pillars are joined by a lookout bridge, 80′ above the water line. She is fitted with twin screws, and is 432′ long, 58′ in beam, and 42′ 7″ deep, of 9,000 tons, and with a dead-weight capacity of about 13,000 tons.

SANDAKAN HARBOR TRADE.—The report of the Harbor Department at Sandakan, British North Borneo, for the year 1905, shows that the shipping entered totalled 126,575 tons, an increase on 1904 of 10,866 tons gross. This was, however, largely due to an extra 8,000 tons of men-of-war. Two new boats, *Darvel* and *Marudu*, were placed on the station, and the coasting trade is in British hands. A tonnage of 792 was dealt with at one time or another on the shipway and a new decked-in barge and a *tongkang* were built and launched. The revenue from native boats and fisheries diminished. The total catch in the bay and the deep-sea fishery trade were about 40,000 piculs. The necessity for better wharfage is urged in the report.

FIRE ABOARD AMERICAN SHIP "DAYLIGHT."—From further particulars of the fire on board the American ship *Daylight*, off the port of Yokkaichi, it appears that the ship arrived there from New York with a cargo of about 105,000 cases of kerosene oil, 200 casks and 700 cases of paraffine wax, and 1,000 cases of machine oil, consigned to the Masuda Shoten, a Japanese firm at Nagoya. The fire broke out at 3 o'clock in the afternoon, and was still raging at noon the next day. Six holes were thereupon made on both sides of the ship, which was then sunk just below the water-line. The quantity of oil burnt is estimated at about 1,000 cases. Fifty casks and 200 cases of paraffine wax, and the whole consignment of machine oil remained in the ship, and it is feared have been completely destroyed.

NEW TRANSPACIFIC FREIGHT LINE.—Messrs. Smith, Bell & Co., of Manila, announce the details of the Transpacific service of the Ocean Steamship Company, Ltd., and the China Mutual Steam Navigation Company, Ltd. Operating in connection with the Great Northern Pacific Railway Company these ocean lines now take cargo on through to overland routes in the United States and Canada, and should sufficient inducement offer the steamers will call at Manila for cargo for the W. coast of the United States. At the present the ports touched are Victoria, Seattle, Tacoma, and all Pacific Coast ports, *via* Nagasaki, Kobé and Yokohama, and the vessels now on the berth are *Stentor*, *Ningchow*, *Yangtsze* and *Keemun*. The steamers of this service are new fast vessels with the most modern discharging gear, and handle cargo without breakage or loss.

CHINA STEAM NAVIGATION COMPANY'S PLANT, HONGKONG.—The shipyards and engineering shops of the China Steam Navigation Company at Hongkong are to be installed with a power gas plant, the capacity of which will be over 300,000 cu. ft. of gas per hour, capable of developing 3,300 h. p. with 75 per cent of the gas after cleansing in four engines, and the remaining 25 per cent will be used for blast furnaces. This is in tended to be the largest installation of the kind in the Far East.

CUNARD-PENINSULAR AND ORIENTAL-ORIENT PACIFIC COMBINE.—The establishment is announced of a joint service of the Cunard with the Peninsular and Oriental and Orient Pacific companies, by which, *via* England or the Mediterranean, passengers may be booked through to or from Egypt, India, China, Japan and Australia.

INTERESTING MARINE INSTALLATION.—An interesting installation is to be seen on board the British steamer *Shimosa* (2,690 tons net). This is one of the comparatively few vessels, which as yet have been fitted with Rich's modern fire communicating system. From the compartment under each hatch a 1″ pipe is run to the chart-room where the pipes converge under an electric fan. In the event of fire breaking out in any compartment a bell is automatically rung, and the fan started; the situation of the fire is then indicated by the smoke drawn up by the fan from the compartment in which the outbreak has occurred. Steam is then turned on and introduced into the compartment in question and the fire may be generally those smothered at once. The one drawback to the system seems to be the possibility of damage to the communicating pipes by the removal of cargo, but even if one pipe should be damaged, the others would not be affected, and by simple daily testing any defects can be easily discovered and remedied.

MISCELLANEOUS

COFFEE CROP, JAVA.—The coffee crop in Java for this year is estimated at 123,000 piculs.

JAPAN SALT AND COKE COMPANY, KOBE.—This company has obtained permission from the Japanese authorities in Manchuria to lay out salt fields in Kwantung Province.

RILEY, HARGREAVES & CO., SINGAPORE.—The tender of this firm for the erection of a new lantern at the Raffles Lighthouse, Singapore, at a cost of $9,935, has been accepted by the government.

WAREHOUSE COMPANY, YOKOHAMA.—It is announced that Mr. T. Chisaka, a member of the House of Peers of Japan, intends to organize a warehouse company with a capital of -Y-3,000,000.

CHINESE ENGINEER STUDENTS.—Viceroy Yuan Shi-kai has selected 25 of the engineers of the Shantung arsenal to proceed to Great Britain and Germany to study the manufacture of arms and equipments of war.

ENCOURAGING INDUSTRIES AND MANUFACTURIES, CHINA.—The high authorities of the maritime and riparian provinces of China have been directed by the Peking authorities to take steps for the promotion of industry and manufacture by native capital.

IMPERIAL IRON FOUNDRY, JAPAN.—The Japanese Government is going to enlarge its iron foundry at an expenditure of -Y-10,000,000. The work will require 3 yrs. for completion. A large quantity of plant and machinery will be ordered from abroad for the purpose.

TOBACCO MONOPOLY, JAPAN.—The proceeds of the Government of Japan from the tobacco monopoly in the fiscal year now drawing to a close, were originally estimated at -Y-32,000,000. It is now believed, however, that the actual receipts are likely to be about -Y-2,000,000 less than the estimate.

REFINED SUGAR PRODUCTS EXHIBITED.—The China Sugar Refining Company, at the request of the Governor of Hongkong, has recently presented for exhibition in the Hongkong court of the Imperial Institute a set of specimens of raw, refined, cube and granulated sugars, and rum and spirits of wine.

ARMOUR PLATE FACTORY, JAPAN.—The construction of the armour plate factory of the Kure Naval Arsenal, Japan, has been completed. The work of construction was originally intended to cover 4 fiscal years, but it is a well-known fact that armour plates have been turned out from works during the past year or two.

SITUATION AT VLADIVOSTOCK.—There should be an opportunity for selling machinery, particularly for flour mills, sawmills, and mines, and to a less extent electrical supplies, structural steel, steam-heating plants, plumbing, etc., which will be in some demand for new buildings at Vladivostock to be constructed shortly.

TIMBER INDUSTRY IN KOREA.—The Japanese Government has 300 woodcutters employed at the present time felling timber in the upper reaches of the Yalu River, in the vicinity of Hyoisanchin, Korea. The number will be guadually increased until at least 500 woodsmen are at work. The trees are all from 200 to 300 yrs. old.

ARMSTRONG POWDER AND AMMUNITION COMPANY.—It is announced that this company, which is erecting the largest powder works in the Far East, at Tokyo, has recently placed orders for the whole of its buildings to be covered with 3-ply "Ruberoid" roofing. This order was placed after severe tests with a number of other roofings.

Siam's Imports and Exports.—The exports of Siam for 1905, are the highest on record amounting to Tcs. 103,130,669, while the exports of 1901 only amounted to Tcs. 101,386,459, those of previous years falling, far and away, short. The imports of 1905, are, however, less than those of 1903 by Tcs. 9,537,358, but with the exception of 1901 the imports into Siam in 1905 have been the greatest recorded.

Singapore's Ice Factory Scheme.—According to *The Singapore Free Press*, an extraordinary meeting of the members of the Singapore Cold Storage Company, Ltd., was held in that city recently to empower the directors to call up additional capital to the extent of $150,000 by the issue of 15,000 shares of $10 each, for the purpose of joining with the company's cold storage business the manufacture and sale of ice.

Trade Associations in China.—Newchwang has two new societies that are calculated to promote commercial relations. One is composed of Japanese and Chinese, and its object is said to be the closer business relations of the Chinese and Japanese. Owing to various rivalries the task is not an easy one, according to the American consul-general, Mr. Sammons. The other society is largely composed of Chinese and Foreigners, whose main idea is the encouragement of exhibits of foreign manufactures.

Engineering Society of Siam.—At its recent annual meeting in Bangkok, the Engineering Society of Siam elected the following officers for the ensuing term:—President, Mr. J. Homan van der Heide; councilmen, Messrs. J. Mackay and Aage Jonsen; honorary treasurer, Mr. G. Salvatore; honorary secretary, Mr. J. W. Hinchley; joint secretary, Mr. J. A. P. Strachan; honorary librarian, Mr. D. Jack. The society is in a flourishing condition professionally and financially, its total membership being 79.

Kerosene Oil Contract, Manila.—The Standard Oil Company of New York has secured the contract to supply the military establishment in the Philippine Islands with oil during the fiscal year beginning July 1st. It was the only bidder, as follows:—On oil to be delivered in Manila, 25 cts. per gall., free entry; 33 cts. per gall., duty paid; delivery at Iloilo or Cebu, 26 cts., free entry, or 34 cts., duty paid. These prices are in gold. The same oil would cost in San Francisco about 20 cts. gold per gall. The contract calls for the supply of 315,000 galls.

United States-Philippine Trade.—The Bureau of Statistics, Department of Commerce and Labor, Washington, publishes figures which show that the value of the commerce between the United States and the Philippine Islands for the present calendar year, is likely to reach $20,000,000 gold, against $15,000,000 for 1905. The value of hemp received from the Islands for the 10 mos. ending October, 1905, was $10,376,528, and that of sugar $2,216 249. The exports to the Islands include agricultural implements, cars and carriages, and manufactures of cotton, iron, steel, leather, wood, etc.

Transport Service Coal Supply, Philippines.—Contracts for supplying 5,000 tons of coal to the Quartermaster's Department of the Philippine Division, to be used by the interisland transport service, were as follows: Henry W. Peabody & Co., New York and Manila, $4.58 per ton; Castle Bros.-Wolf & Sons, Manila, $4 895; Macondray & Co., Manila, $4.76; W. F. Stevenson & Co., Manila, $4,88; Ker & Co., Manila, $5.48; Mitsui Bussan Kaisha, $5.64 per ton for Manila and $6.24 and $7.24 for coastwise ports; Scott, Fells & Co., Australia, $4.815 and $4.515 per ton, the latter figures being based on 2d-grade coal. All quotations are in gold.

Tientsin General Chamber of Commerce.—The annual report of this organization shows that in 1905 the imports from foreign countries went to Tls. 31,463,208 from Tls 16,256,651 in 1904. The imports from native ports amounted to Tls. 54,102 531 as against Tls 40,669,898 in 1904. The exports to foreign countries have risen from Tls. 2,069,362 to Tls. 7,595,982. The total value of imports amounted to Tls. 100,305,098 against Tls. 71,821,928 in 1904 and against Tls. 32,389,621 20 yrs. ago. Duties have risen in sympathy with trade and amounted in 1905 to the record figures, Tls. 2,963,336, against Tls. 2,009,198 in 1904. The tonnage of shipping was also a record being 885,515, an increase of over 117,000 tons. Money value herein contained are expressed in Hongkong taels. These figures do not include Chin-wang-tao which has a total revenue of Tls. 21,851,000 against Tls. 10,173,000 in 1904, a large proportion of which belongs to Tientsin.

Shell Transport and Trading Company.—It is announced from London that the Shell Transport and Trading Company has decided to give up the European part of its business so as to be able to work with greater freedom in the markets of the Far East. Some think that it has made an arrangement with the Standard Oil Company. The Shell Company, working through the medium of the General Petroleum Company, Ltd., had organized extensive petroleum distribution business in England, two of its most recent storage installations being at Manchester and Barrow. A price-cutting war had been in progress in England for more than a year, and if some arrangement of the kind mentioned has been made this antagonism will most likely be terminated. The three leading competitors of the Shell company are Anglo American Oil Company, representing the Standard; the Consolidated Petroleum Company, supported by Nobel and Rothschild, and the Homelight Oil Company, founded by Messrs. Gukassow and Mantascheff, leading Baku (Russia) producers and refiners.

FINANCIAL

Chinese Engineering and Mining Company, Ltd.—This company has declared an interim dividend of 1l- per share.

Kansai Railway Company, Japan.—The Kansai Railway Company has declared a dividend of 6.3 per cent.

Shanghai Oil Company.—At a recent meeting of the provisional directors of the Shanghai Oil Company, recently, the company was successfully floated.

International Banking Corporation, Shanghai.—The Shanghai branch of the International Banking Corporation has begun to issue $5, $10 and $100 notes

Hotel de l'Europe, Singapore.—It is reported that the syndicate of this hotel has sold its proprietory rights in the property to the Hotel Cecil of London, for $1,000,000.

Indo-China Bank.—This bank will soon open a branch house at Peking, and Mr. Casanova, former 1st secretary to the French Legation in China will be its manager.

Hall and Holtz, Ltd.—At a recent meeting of the directors of this company, in Shanghai, it was decided to recommend a dividend of 12½ per cent and carry forward $20,000.

Hokkaido Hemp Works Company, Japan.—The total net profits of this company for the second half of last year amounted to -Y-137,461. A dividend amounting to 15 per cent *per annum* has been declared.

Hydroelectric Company, Japan.—A scheme is in progress to organize a hydroelectric power company at Onuma (Great Swamp), Kameda District, Hokkaido. The promoter is Mr. Okito Abe. The Company will have a capital of -Y-1,000,000.

Sumatra Minerals Syndicate.—The Sumatra Minerals Syndicate has been registered in London with a capital of £6,000, in £1 shares. It is to adopt an agreement with the Anglo-Continental Gold Syndicate, which is manager, and receive 10 per cent of net profits.

Subsidy for Osaka Shosen Kaisha.—This Japanese steamship company has received a subsidy of -Y110,000 a year from the government for its service to Tairen. The conditions are a bi-weekly service with steamers of over 1,500 tons of a speed of over 13 knots. The service has been inaugurated with four vessels.

Chino-Japanese Shipping Company.—The Peking Government has approved the formation of a joint stock Chino-Japanese shipping company, to be called the Manchurian Steamship Company, to undertake the carrying trade on the rivers of Manchuria. The capital of Tls.500,000 has been subscribed, and operations will soon begin.

Hanshin Electric Railway Company, Japan.—At a general meeting of the shareholders of this company, the following account was presented:—Net profits -Y-98,916, balance brought forward -Y-324; total, -Y-99,240. Distributed as follows: Reserves -Y-5,340, bonus to officers -Y-9,890, dividend (8 per cent *per annum*) -Y-75,000, carried forward -Y-9,010.

Ice Factory Scheme for Singapore.—At an extraordinary meeting of the members of the Singapore Cold Storage Company, Ltd., in that city recently the directors were empowered to call up additional capital to the extent of $150,000 by the issue of 15,000 shares of $10 each, for the purpose of combining with the company's cold storage business the manufacture and sale of ice.

Toyo Kisen Kaisha, Japan.—At a recent general meeting of the Oriental Steamship Company (Toyo Kisen Kaisha), the following account was adopted:—Net profit, -Y-167,724,837; balance brought over, -Y-21,587,51; appropriation from the dividend equalization fund, -Y-20,000. Total, -Y-212,312,347.

To reserve, -Y-10,000; to dividends (12 per cent per annum), -Y-195,000; carried forward, -Y-7,802,347.

Tokyo Stock Exchange.—The Tokyo Stock Exchange has increased its capital from -Y-1,200,000 to -Y-4,000,000 of 55,000 shares, representing the increase of capital amounting to -Y-2,750,000, 52,000 shares are to be distributed among the shareholders existing on July 3rd, at the rate of 2.8 shares per old share; and the remaining 3,000 shares will be distributed among stock brokers existent on March 1st.

Bank of Formosa.—The accounts for the latter half of 1905 show gross earnings of -Y-1,079,863,11 and gross expenditures of -Y-864,316.-681, leaving a total net profit, including -Y-49,931.211 brought forward from previous account, of -Y-265,477.64. This sum has been distributed as follows:—General reserve, -Y-50,000; dividend equalization fund, -Y-10,000; special reserve, -Y-10,000; bonus to staff, -Y-15,000; dividend, -Y-125,000; carried forward, -Y-55,477.64.

Hongkong's Financial Statement, 1905.—Hongkong's financial statement for 1905 shows the receipts to have been $6,918,403, of which $500,000 were for land sales; and expenditure to have been $6,951,275. The revenue was only $280,198 below the amount estimated, while the actual payments were also short of those anticipated by $223,926. The liabilities at the close of the year amounted to $15,119,399 and the assets to $15,560,894, leaving a balance of $441,495.

Tokyo Street Railway Company, Japan.—The Tokyo Street Railway Company is negotiating a loan of -Y-6,000,000 with a London bank, the company's bonds, indorced by the Industrial Bank of Japan. Ltd., being the security offered. It is understood that the actual amount the company will receive will be -Y-91 per -Y-100 and the loan will bear 4½ per cent, the principal to be redeemed 10 yrs from 1910. The company proposes to redeem its high interest debentures, amounting to -Y-3,500,000, and the balance of -Y-2,500,000 will be used for the improvement of its rolling stock, etc.

Seoul-Fusan Railway.—At a recent general meeting of the Seoul-Fusan Railway Company, held in Yokohama, the following account of the business of the railway were adopted:—*Seoul-Fusan Line* Subsidy, -Y-433,261,430 distributed as follows: Expenses -Y-131-532,825; dividend (about 4.2 per cent per *annum*), -Y-300,000,000, reserve for equalization of dividends, -Y-1,728,605. *Seoul Chemulpo Line*—Net profit, -Y-45-257,626; balance brought forward, -Y-53,059,633. Total, -Y-98,317,259. Distributed as follows: Reserves, -Y-2-262,890; royalties, -Y-45,000,000; interest on loans, -Y-9,016,000; fund for repairs, -Y-42-038,369.

Hankaku Railway Company, Japan.—Negotiations have been concluded between the Industrial Bank of Japan and this railway company for a loan of -Y-3,000,000, to bear interest of 7.3 per cent, and to be repaid in 10 yrs. The railway is offered as security. The account for the last half-year working of the line, is as follows:—Net profits, -Y-71,868, balance of last account -Y-435; total -Y-72,303. Distributed as follows: Reserves -Y-3,620, dividend (3.3 per cent *per annum*) -Y-64,000, rewards to officers -Y-3,000, debentures repaid -Y-1,000, carried forward -Y-683.

Kyushu Railway Company.—The following account was submitted at the recent general meeting of the stockholders of this company, at Moji:—Net profits -Y-2,313,252, balance of last account -Y.560,913; total -Y-2,874,165. Distributed as follows: Reserves -Y-163,000, fire insurance fund -Y-22,000, rewards to officers -Y-10,000, dividend (9 per cent *per annum*) -Y-2,198,196, carried forward -Y-485,969. An extraordinary general meeting was also held, and a proposal to construct new lines between Yanagigaura and Oita, Nakama and Kagawa, and Yamamato and Kishidake, was submitted. The necessary funds will be obtained from the payment on the shares of second new issue, and from a loan. The capital will be increased from -Y-62,000,000 to -Y-67,400,000

Bank Profits, Japan.—The six principal banks of Tokyo and Osaka show fine profits for the last half of 1905. The capital of the Mitsui bank is $2,500,000, in addition to $3,200,000 reserves, and $130,000 surplus from previous account. Their 6 mos' profits were at the rate of 13 per cent *per annum*. The Yasuda bank's capital, including reserves, is $1,630,000, on which they earned 14 per cent. The Mitse Bishi bank has $1,572,000 capital and reserves, on which they cleared 19 per cent. The Sumitomo bank cleared 17 per cent on $1,810 000 capital and reserves. The Konoike bank made 10 per cent on its $1.346,000. Finally, the Yamaguchi bank cleared 11 per cent *per annum* on $750,000 capital, reserves, and surplus. But it is generally believed that the actual banking profits are far greater.

Hongkong Electric Company, Ltd.—At the seventeenth ordinary yearly meeting of the shareholders of the Hongkong Electric Company, Ltd., held in that city this month, the directors submitted a statement of the company's accounts for the period of 10 mos. ended February 28th, as follows:—Balance at credit of profit and loss account, $103,244 69; after deducting $2,500 for directors' fees there remained $100,744 69 available for appropriation as follows: To pay a dividend for the 10 mos. at the rate of 12 per cent *per annum* (say $1 per share on 30,000 original fully-paid shares, $30,000; say 65 cents per share on 29,592 new issue shares on which the final call has been paid, $19,299.80; say 50 cents per share on 308 part paid shares, $154), $49 453.80; to write off plant account for depreciation, $42,392.48; to write off property account for depreciation, $6,329.97; to carry forward to current account, $2,568.44. Total, $100,744 69.

Manila Railway Company, Ltd.—Interest in the position of the Manila Railway Company, Ltd., is quickening from time to time in London, according to a recent issue of *The London and China Express*. Although nothing is known as to the course of negotiations at Washington, there is a confident belief in the interested circles of London that the Company will be able to come to terms with the United States Government. Of course interest centers in the debenture arrears. On July 1st next the accrued coupons thereon will amount to just 90 per cent, and although their absolute rights are suspended for the present, they are fully preserved and have to be dealt with in the future. In 1904 the earnings of the company represented 4 to 5 per cent upon these debentures, and last year a gross increase of about £24 000 in traffic was secured. The claims against the United States and Spanish governments reached a total of over £300,000. The 6 per cent debentures are quoted at 123 *cum* the 90 per cent in arrears after being up to 130. When the reconstruction is carried through, the latter will probably be funded on terms which will make the debentures worth more.

Trade of Japan, 1905.—Japan's exports for last year, according to government, official statistics amounted to -Y-321,533,610, and the imports to -Y-488,538,017, totalling -Y-810,071.627, an unprecedented figure in the commerce of the empire. In consequence of the large volume of trade, there was a great increase in the shipping traffic. The total tonnage of steamers arriving at ports was 14,378,083, the revenue from imports and tonnage duties amounting to -Y-35,181,134. This revenue again far exceeded the records for past years. The scarcity of available domestic vessels, owing to the government chartering them for transporting the troops, occasioned an enormous increase in the arrivals from foreign countries. Of the gross tonnage of arrivals before mentioned the British steamers alone stood at the unique figure of 6,764,378 tons, this being about five times as much as the tonnage registered for domestic steamers With regard to exports, there was a sudden increase in the China trade, the exports amounting to -Y-98,681,998, thus bringing China to the head of the export list. As to imports there was a general increase all round, especially from Great Britain and the United States with -Y-115,380,101 and -Y-104,286,628 respectively. These two countries did more than one-half of the import trade in 1905.

FAR EASTERN SHARE QUOTATIONS

COURTESY OF BENJAMIN, KELLY & POTTS, SHAREBROKERS, HONGKONG, May, 1906.

STOCK	WHEN ESTAB-LISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation* PER CENT	CLOSING QUOTATIONS
Banks.												
Hongkong and Shanghai Banking Corporation	1865	$10,000,000	80,000	$125	$125	g £1,000,000 s $9,500,000 i $250,000	$1,699,777	31-12-05	£1.15/- div. & £1 bonus @ ex. 2/0-9/16 $26.87 for second half-year 1905	26 2-06	5	$860 London £90
National Bank of China, Limited	1891	£699,475	(10) 99,925	£7	£5	c £12,735 $150,000	$74,099	31-12-05	$2 (London 3/6) for 1903	1-2-04	—	$38
Marine Insurances.												
Canton Insurance Office, Limited	1881	$2,500,000	10,000	$250	$50	$1,600,000 j $147,895	$211,540	31-12-04	$20 for 1904	21-10-05	5½	$335 buyers
China Traders' Insurance Co., Ld.	1865	$2,000,000	24,000	$83.33	$25	$950,000 f $248,480 j $242,692 u $274,151	466,294	31-12-05	$3 for 8 months ending 31-12-1905	30-4-06	4¾	$93 ex div.
North China Insurance Co., Ld.	1863	£150,000	10,000	£15	£5	g £100,000 s Tls. 100,000 f Tls. 50,000	Tls. 302,053	30-6-05	Final of 7/6 making 15/- for 1904	25-10-05	5½	Tls. 90 sales
Union Insurance Society of Canton, Limited	1867	$2,500,000	10,000	$250	$100	s $2,000,000 g £40,000 f $331,131 j $1,153,844 u $569,279	$2,792,271	31-12-05	$30 for 1905	30-4-06	4	$775
Yangtsze Insurance Association, Ld.	1862	$800,000	8,000	$100	$60	$800,000 j $61,278 f $15,527	$508,334	31-12-05	$12 and $3 special dividend for 1904	19-4-06	8½	$175
Fire Insurances.												
China Fire Insurance Co., Ld.	1870	$2,000,000	20,000	$100	$20	$1,000,000 x $229,488	$344,098	31-12-05	$6 for 1904	9-3-06	7	$86
Hongkong Fire Insurance Co., Ld.	1868	$2,000,000	8,000	$250	$50	f $2,616 $1,221,928	$422,618	31-12-05	$25 for 1904	8-3-06	8	$305
Shipping.												
China and Manila Steamship Co., Ld.	1882	$750,000	(1) 30,000	$25	$25	$6,000	$6,563	31-12-05	$1½ for 1905	15-3-06	8	$19
Douglas Steamship Co., Ld.	1883	$1,000,000	20,000	$50	$50	$261,638 i $88,941	Nil.	30-6-05	$3½ for year ended 30-6-1905	25-9-05	8¾	$40
Hongkong, Canton and Macao Steam-boat Company, Ld.	1865	$1,200,000	80,000	$15	$15	e $250,000 d i $600,000 f $154,331	$24,080	31-12-05	$1 for 2nd half-year mak. $2 for 1905	16-2-06	8	$25
Indo-China Steam Navigation Company, Ld.	1882	£1,200,000	(2) 60,000	£10	£10	£120,000 i £241,150 h £3,999	£4,435	31-12-04	12/- @ 1/10 ⅞=$6.29.51 for 1904	13-7-05	6¾	$92
Shanghai Tug and Lighter Co., Ld. Do. Preference.	1903	Tls. 1,500,000	200,000 100,000	Tls. 50	Tls. 50	i Tls. 40,000	Tls. 23,156	31-12-05	Final of Tls. 3. making Tls. 5 for 1905 Final of Tls. 1¾ making Tls. 3½ for 1905	13-3-06	8 7	Tls. 62 buyers Tls. 50 buyers
"Shell" Transport & Trading Co., Ld.	1898	£2,000,000	2,000,000	£1	£1	£400,000 i £4,144	£7,815	31-12-04	1/- (Coupon No. 6) for 1905	1-1-06	4	27/-
"Star" Ferry Co., Ld.	1898 1900	$200,000	10,000 10,000	$10 $10	$10 $5	$65,000 i $24,257	$929	30-4-05	$1.80 90 cents for year ended 30-4-1905	29-5-05	5¾ 4	$33 $23
Taku Tug & Lighter Co., Ld.	—	Tls. 1,500,000	30,000	Tls. 50	Tls. 50	Tls. 98,000 d Tls. 350,479 e Tls. 48,000 i Tls. 81,200	Tls. 13,913	31-12-05	Final of Tls. 2 making Tls. 4 for 1905	1-3-05	10	Tls. 40 sales
Refineries.												
China Sugar Refining Company, Ld.	1878	$2,000,000	20,000	$100	$100	$850,000 e $450,000 r $86,129	$40,419	31-12-05	Final of $15 making $25 for 1905	22-3-06	14¼	$175 sellers
Luzon Sugar Refining Company, Ld.	1882	$700,000	7,000	$100	$100	none	Dr. $85,987	31-12-04	$3 for 1897	24-3-98	—	$25
Perak Sugar Cultivation Co., Ld.	—	Tls. 350,000	7,000	Tls. 50	Tls. 50	Tls. 100,000	Tls. 3,723	31-7-05	Tls. 2½ for year ending 30-9-1904	20-12-04	—	Tls. 85 sales
Mining.												
Chinese Engineering & Mining Co., Ld.	1901	£1,000,000	1,000,000	£1	£1	d £80,000 h £12,289	£13,355	28-2-05	1/-(No.6) int.d. for 12m. endg. 28.2.06	1-5-06	6¼	Tls. 10 ex div. b.
Oriental Consolidated Mining Co., Ld.	1901	G. $5,000,000	y 500,000	G. $10	G. $10	none	G. $909,050	30-6-05	Final of 50 cts. mak. G. $1 for 1905	21-12-05	6¼	G. $16
Raub Australian Gold Mining Co., Ld.	1892	£200,000	150,000 50,000	£1 £1	18/10 £1	£4,873	Dr. £8,745	31-3-05	No. 12 of 1/-=48 cents	28-1-01	—	$3 sales

STOCK	WHEN ESTAB-LISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation * PER CENT	CLOSING QUOTATIONS
Docks, Wharves and Godowns.												
Farnham (S. C.), Boyd & Co., Ld	1901	T5,520,000	55,200	T100	T100	T1,000,000	T34,924	30-4-05	Interim of Tls. 4 for year 1905-6.	6-1-06	10	T119
Fenwick (Geo.), & Company, Ld	1889	$450,000	z 18,000	$25	$25	$70,000	$8,915	31-12-05	$2 on old & $1 on new issue for 1905	12 3-06	9½	$22
Hongkong and Kowloon Wharf and Godown Co., Ld	1886	$2,000,000	40,000	$50	$50	$550 000 d.r. $65,160 i $20,000	$20,040	31-12-05	Final of $3½ making $6 for 1905	15-3-06	5¾	$105
Hongkong & Whampoa Dock Co., Ld.	1866	$2,500,000	50,000	$50	$50	$49,500	$362,323	31-12-05	$6 for second half year 1905	27-2-06	7¼	$164
New Amoy Dock Co., Ld	1892	$67,500	10,000	$6¾	$6¾	$88,000	$2,221	31-12-05	$1 for 1905	1-3-06	6	$17 buyers
Shanghai and Hongkew Wharf Co. Lt.	1902	T3,200,000	32,000	T100	T100	b T487,210 r T100,734	T57,065	31-12-05	Final of T8 making T14 for 1905	29-3-06	6½	T225 nom
Vulcan Ironworks, Ltd.	1905	T500,000	1,000	T500	T375	—	—	—	First year	—	—	T375 buyers
Yangtsze Wharf and Godown Co., Ld.	1902	T250,000	2,500	T100	T100	T30,000	T5,668	31-12-05	T18 for 1905	31-3-06	8¼	T220 buyers
Lands, Hotels and Buildings.												
Anglo-French Land Investment Company, Ltd	1906	T2,500,000	(3) 25,000	T100	T100	—	—	—	First year	—	—	T100
Astor House Hotel Co., Ltd.	1901	$750,000	(4) 30,000	$25	$25	$14,156	$9,028	30-6-05	$2½ for year ending 30-6-1905	20-8-05	8¼	$32 sellers
Astor House Hotel, Ld. (Tientsin)	—	T100,000	2,000	T50	T50	e T34,000 T8,000	T1,013	28-2-06	Final of T6½ making T11½ for year ending 28-2-05	—	7¼	T147 sellers
Central Stores, Ld.	—	$451,845	6,000	$15	$15	—	$4,719	31-12-05	$2.40 on $12 for 1905	13-3-06	13¼	$18½
Do. (Founders')	—		123	$15	$12				None	—	—	$300 buyers
Do. (New Issue)	1904		24,000	$15	$15				7% on $7½ for 1905	13-3-06	—	$15¼ buyers
Hongkong Hotel Co., Ld.	1866	$600,000	12,000	$50	$50	$648,975 r $24,071	$619	31-12-05	$5 for second half-year 1905	6-3-05	7½	$132
Hongkong Land Investment and Agency Co., Ld.	1889	$5,000,000	50,000	$100	$100	e $250,000	$67,839	31-12-05	Final of $3½ making $7 for 1905	2-2-06	6	$119 buyers
Hotel des Colonies Co., Ld.	1902	T225,000	9,000	T25	T25	n T20,986	T7,202	31-3-05	Interim of T1	11-1-05	14	T17
Hotel Metropole Company, Limited	1904	$200,000	2,000	$100	$100	none	$4,699	30-6-05	Final of $6 making $10 for the year.	26-7-05	10	$100
Humphreys' Estate & Finance Co., Ld.	1887	$1,500,000	150,000	$10	$10	i $208,386 e $50,000	$5,070	31-12-05	80 cents for 1905	12-2-06	7	$11½
Kowloon Land and Building Co., Ld.	1889	$300,000	6,000	$50	$30	none	$574	31-12-05	$2½ for 1905	7-2-06	6½	$39
Shanghai Land Investment Co., Ld.	1901	T2,600,000	52,000	T50	T50	T909,593 e T170,000	T52,194	31-12-05	Final of Tls. 3 making T6 for 1905	20-2-06	5	T119 sales
Tientsin Land Investment Co., Ld.	1902	T772,600	7,726	T100	T100	i T71,588	T385	31-12-05	Final of Tls. 5 making Tls. 8 for 1905	24-2-06	7	T110
West Point Building Co., Ld.	1889	$625,000	12,500	$50	$50	none	$772	31-12-05	Final of $1.90 making $3.65 for '05	2-2-06	7	$53
Cotton Mills.												
Ewo Cotton Spinning and Weaving Co., Ld.	1895	T1,000,000	(5) 20,000	T50	T50	T45,939	T100,000	31-10-05	T8 for year ended 31-10-1905	18-12-05	11	T74 buyers
Hongkong Cotton Spinning, Weaving and Dyeing Co., Ld.	1901	$1,250,000	125,000	$10	$10	e $30,000	$23,264	31-7-05	$1 for year ended 31-7-1905	4-9-05	6	$16
International Cotton Manufacturing Co., Ld.	1895	T750,000	(6) 10,000	T75	T75	T100,000	T18,718	30-9-05	Interim of 3% a/c 1898	30-4-98	—	T67½ sales
Laou-kung-mow Cotton Spinning & Weaving Co., Ld.	1895	T800,000	(7) 8,000	T100	T100	none	T30,760	31-12-05	Tls. 8 for 1905	21-2-06	11	T72½ buyers
Soey Chee Cotton Spinning Co., Ld.	1895	T1,000,000	2,000	T500	T500	l T18,456	T35,986	31-12-05	Tls. 25 for 1905	7-3-06	8	T320 buyers
Miscellaneous.												
Anglo German Brewing Co., Ltd.	1904	$100,000	4,000	$100	$100	none	$1,066	31-12-05	$7 for 1905	1-3-06	7	$100 sellers
Bell's Asbestos Eastern Agency, Ld.	1895	£5,377.10s	3,604	12/6	12/6	£314	£770	31-12-04	1s. 3d for 1904	21-7-05	9	$7¼
Campbell, Moore & Co., Ld.	1886	$12,000	1,200	$10	$10	$9,000	$1,097	31-12-05	$3 for 1905	2-4-06	9¼	$32
China-Borneo Co., Ld.	1903	$720,000	(8) 60,000	$12	$12	none	Nil	31-12-05	$1 for 1904	17-3-05	—	$7
China Flour Mill Co., Ld.	—	T200,000	4,000	T50	T50	T50,000	T889	31-12-05	Final of T 5 making T 10 for 1905.	17-3-06	12½	T8 0 buyers
China Light and Power Co., Ld.	1901	$500,000	50,000	$10	$10	none	$1,219	28-2-06	60 cents for year ending 28-2-1906	9-4-06	6%	$1 0 buyers
China Provident Loan and Mortgage Co., Ld.	1898	a $1,000,000	100,000	$10	$10	$100,000	$4,791	31-12-05	80 cents for 1905	22-1-06	9	$9
Dairy Farm Company, Ld.	1896	$187,500	25,000	$7½	$6	$25,000	$2,864	31-7-05	$1.20 for year ending 31-7-1905	24-11-05	7½	$16

STOCK	WHEN ESTABLISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN PAID	Approximate Return at Present Quotation* PER CENT	CLOSING QUOTATIONS
Miscellaneous.—Continued												
Green Island Cement Co., Ld.	1889	$1,500,000	150,000	$10	$10	*p* $410,000 / $500,000	$52,291	31-12-05	$2 div. & 50 cents bonus for '05	26-2-06	8¼	$29½
Hall & Holtz, Ld.	—	$420,000	21,000	20	$20	$186,000	$20,893	28-2-06	$2½ for year ending 28 2-06	26-4-06	11	$22½
Hongkong Electric Co., Ld.	1889 / 1899	$600,000	30,000 / 30,000	$10 / $10	$10 / $10	none	$2,568	28-2-06	$1.00 / 65 cents for 10 months ending 28-2-06	13-5-06	7½	$16 ex div.
Hongkong High-Level Tramways Co., Ld.	1887	$125,000	1,250	$100	$100	$50,000	$2,796	30-11-04	$15 for year ending 30-11-04	24-12-04	6½	$235
Hongkong Ice Company, Ld.	1881	$125,000	5,000	$25	$25	*k* $80,000	$3,776	31-12-05	Final of $15 making $19 for 1905	16-2-06	8	$240 buyers
H'kong Rope Manufacturing Co., Ld.	1883	$500,000	50,000	$10	$10	$61,000	$5,813	31-12-05	$9 for 1905 On 5 shares	15-3-06	6¼	$29
Hongkong Steam Waterboat Co., Ld.	1900	$150,000	15,000	$10	$10	$2,500	$88	30-9-05	Final of 50 cents making $1 for year ended 30-9-1905	24-11-05	10	$9½
Maatschappij tot Mijn-, Bosch-en Landbouwexploitatie in Langkat	1902	Gs.2,500,000	25,000	G.100	G.100	*i* T528,210 / T19,465	T35,849	31-10-04	First quarterly dividend of T7½ account 1906	15-3-06	8¼	T240 buyers
Mondon, (E. L.) Ld.	1902	T350,000	7,000	T50	T50	none	*Dr.* T117,638	31-12-04	T5 for 1902	2-5-03	—	T25 sellers
Philippine Company, Ld.	1904	$675 000	67,500	$10	$10	none	*Dr.* P34,324	31-12-05	None	—	—	$5 buyers
Shanghai Gas Co., Ld.	1903	T800,000	16,000	T50	T50	*d* T165,000	T11, 017	31-12-05	T3 final & T1½ bonus making in all T8½ for 1905	7-3-06	6¼	T135 buyers
Shanghai Horse Bazaar Co., Ld.	1904	T270,000	5,400	T50	T50	T45,000	T9,751	31-12-04	T6 for 1904	17-3-05	11	T55 sales
Shanghai Pulp and Paper Co., Ld.	—	T450,000	4,500	T100	T100	*e* T37,000 / T8,000	T2,753	31-12-05	Final of T8 making T14 for 1905	27-2-06	9¼	T150 sellers
Shanghai Sumatra Tobacco Co., Ld.	1902	T600,000	(9) 30,000	T20	T20	*w* T24,820 / T25,000	T1,452	31-10-05	Final of T3 making T5 for the year	15-3-06	7¼	T68 buyers
Shanghai Waterworks Co., Ld.	1881	£288,000	8,175 / 7,200	£20 / £20	£20 / £5	T190,000	T85,592	31-12-05	Final of 37/6 making 52/6 for 1905 / First year	29-3-06 / —	— / —	T450 / T200 buyers
South China Morning Post, Ld.	1903	$150,000	6,000	$25	$25	none	*Dr.* $5,068	29-2-05	None	—	—	$20
Steam Laundry Co., Ld.	1902	$100,000	20,000	$5	$5	none	$1,134	31-5-05	50 cents for year ended 31-5-05	20-11-05	8¼	$6
Tientsin Waterworks Co., Ld.	1901	T200,000	2,000	T100	T100	*e* T15,259 / T4,000	T1,012	30-4-05	Interim of T4 for year 1905/6	12-2-06	7¾	T. 110
United Asbestos Oriental Agency, Ld. / Do. do (Founders')	1896	$100,000	9,900 / 100	$10 / $10	$4 / $10	$22,000	$551	31-5-05	80 cents / $19.80 for year ended 31-5-05	29-7-05	9 / 11	$9 / $180
Watson (A. S.) & Co , Ld.	1886	$900,000	90,000	$10	$10	$300,000 / $25,000	$6,096	31-12-04	Interim of 50 cents for 1905	25-11-05	7½	$13½
William Powell, Ld.	1901	$150,000	15,000	$10	$10	*e* $4,500	$676	30-6-06	Interim div. of 50 cents for the year 1905/6	10-4-06	10	$10½

LOANS AND DEBENTURES	AGENTS FOR THE LOAN	AMOUNT OF LOAN	PAR VALUE	OUT-STAND'G BONDS	WHEN PAYABLE	CLOSING QUOTATIONS
China Government, 7 per cent. Silver Loan 1886 E.	Hongkong & Shanghai Bkg. Cor.	T767,200	T250	1914	Mar. 31st & Sept. 30th each year until Mar. 31st, 1917.	par.
Hongkong Hotel Co., Ltd., 6% Mortgage Debentures of 1899‡	Hongkong & Shanghai Bkg. Cor.	$500,000	$500	§ all	Half yearly, June 30th and December 31st	par.
Shanghai & Hongkew Wharf Company, Ltd. 6% Debentures of 1902	Hongkong & Shanghai Bkg. Cor.	T543,900	T100		Half yearly, June 30th and December 31st	T96
Astor House Hotel Co., Ltd. 8% Debentures of 1903	Hongkong & Shanghai Bkg. Cor.	T500,000	T100		Half yearly, January 1st and July 1st	T105
Chinese Engineering & Mining Co., Ltd., 6% Debentures of 1903†		£500,000	¶	£431,960	Half yearly, June 30th and December 31st	par.
International Cotton Manufacturing Co., Ltd. 6% Debentures of 1901	Russo Chin. Bk.	T500,000	T100	‖	Half yearly, March 31st and September 30th	par.

(Closing quotations: Plus accrued interest)

a Auhorized capital $2,000,000.
b Building Reserve Account.
c Capital Reserve Fund.
d Depreciation Fund.
e Equalization of Dividend Fund.
f Exchange and Investment Fluctuation Account.
g Gold Reserve Fund.
h Exchange Reserve Account.
i Insurance Fund.
j Reinsurance Fund.
k Contingencies Account.
l Legal Reserve Fund.
m
n Sinking Fund.
o
p Premium on New Issue.
q
r Repairs and Renewals Account.
s Silver Reserve Fund.
t
u Underwriting Suspense Account.
v
w Special Works Fund.
x Extra Reserve Fund.
y 72,560 owned by the Company.
z 6,000 shares unissued.
1 5,725 shares unissued.
2 First issue of 60,000 of which 10,411 unalloted.
3 5,000 shares unissued.
4 7,600 shares unissued.
5 5,000 shares unalloted.
6 1,616 shares unalloted.
7 842 shares unissued.
8 14,000 shares unissued.
9 17,000 shares unissued.
* Based on last year's dividend.
‖ Only Tls. 134,000 taken up.
§ 216 held by the Company.
¶ In certificates of £20 and £100.
‡ Redeemable in 10 years, or at option of Company the Company giving 6 months' notice.
† Redeemable at par at rate of £10,000 per annum from 31st December, 1903, to 31st December 1952.
Dr. Deficit.

SINGAPORE SHARE QUOTATIONS.

Courtesy Messrs. Fraser & Co., Brokers, Singapore, May, 1906.

Name	Date of Formation	Capital	Capital Paid Up	No. of Shares	Issue Value	Paid Up	Reserve	Last Dividend	Since Last Mail: Highest	Since Last Mail: Lowest	Closing Quotations
Mining.									$	$	$
Belat Tin Mining Co., Ltd.	1903	$300,000	300,000	30,000	10	10			3.00	2.50	3.00 buyers
Bersawah Gold Mining Co., Ltd.	1900	$175,000	140,000	10,000 *1*	10	10			13.00	12.50	12.50 sellers
" " " " " *Deferred.*				4,000	10	10					8.00 sellers
Duff Development Co., Ltd.	1903	£400,000	350,000	350,000 *2*	1	1					5.50 sellers
Bruseh Hydraulic Tin Mining Co., Ltd.	1901	$600,000	600,000	60,000	10	10			12.25	12.00	12.25 sales
Kadana Gold Mining Co., Ltd.	1901	$300,000	300,000	20,000	10	10					2.00 sellers
" " " " *Pref.*				10,000	10	10					10.00 nominal
Kechau Goldfields, Ltd. *Fully paid*	1902	£30,000	16,175.7/-	6,207	1	1					in liquidation
" " " *Contrib.*				10,493 *3*	1	19/-					in liquidation
Kinta Tin Mines, Ltd.	1901	£60,000	60,000	60,000	£1	£1		20% paid for 1905			12.75 sales & sellers
Kuantan Tin Mining Co., Ltd.	1905	$150,000	99,000	9,900 *4*	10	10		30% paid for 1905	12.75	12.25	12.75 sales & sellers
Pahang Corporation, Ltd.	1889	£250,000	244,306	244,306 *5*	1	1	20,000	3% for year ending 30-6-02	1.90	1.75	1.75 sales
Pahang Kabang, Ltd.	1890	£375,000	375,000	360,000	1	1					0.50 sellers
" " *Pref.*				15,000	1	1					nominal
Pusing Lama Tin Mines, Ltd.	1904	£120,000	98,000	98,000 *6*	1	1		5% interim for 1906	10.50	10.25	10.40 sellers
Queensland Raub G.M.Co., Ltd. *Fully paid*	1901	£146,700	100,866	36,700	1	1					nominal
" " " *Contrib.*				110,000	1	11/8					nominal
Raub Aust. Gold Ming. Co., Ltd. *Fully paid*	1892	£200,000	191,250	50,000	1	1	4,873	1s. paid January, '01			2.50 sellers
" " " " *Contrib.*				150,000	1	18/10		1s. " " "			2.50 sellers
Redjang Lebong Mining Co.	1898	*f*.2,000,000	1,800,000	18,000 *7*	100	100		32% for year ending 31-12-05			495.00 buyers
Royal Johore Tin Mining Co., Ltd.	1900	$220,000	220,000	22,000	10	10		5% for year ending 15-2-04	3.25	3.00	3.00 sales
ipiau Tin Co., Ltd.	1899	$230,000	230,000	23,000	10	10		12½% for year ending 31-12-05			6.00 sellers
Tronoh Mines, Ltd.	1902	£160,000	149,185	149,185 *8*	1	1		1/6 interim div. for 1906			19.25 sellers ex (div.)
Rubber.											
Anglo-Malay Rubber Co., Ltd.	1905	£150,000	140,000	140,000 *9*	1	1					£3 0s 0d
Balgownie Rubber Estate, Ltd.	1905	$200,000	100,000	20,000	10	6					$11.75 buyers
Batu Caves Rubber Co., Ltd. *Fully paid*	1904	£30,000	11,125	7,000 *10*	1	1					£1 10s 0d.
" " " " *Contrib.*				11,000	1	7/6					£1 0s. 0d.
Batu Unjor Rubber Co., Ltd.	1905	$700,000	610,000	61,000 *11*	10	10			23.75	23.50	$23.50 sellers
Bukit Rajah Rubber Co., Ltd. *Fully paid.*	1903	£70,000	59,250	54,000 *12*	1	1					£4 2s. 6d.
" " " " " *Contrib.*				7,000	1	15/-					£3 17s. 6d.
Castlewood Rubber Co., Ltd.	1906	$150,000	125,000	12,500 *13*	10	10					$10.00 sales & sellers
Cicely Rubber Estates Co., Ltd.	1904	£12,000	10,500	6,000	1	1					£3 0s. 0d.
" " 5% Pref.				6,000	1	15/-					£2 10s. 0d.
Consolidated Malay Rubber Estates, Ltd.	1905	£75,000	55,000	55,000 *14*	1	1					£2 2s. 6d.
Ledbury Rubber Co., Ltd.	1906	$250,000	225,000	22,500 *15*	10	10					$11.00 sales
Malacca Rubber Plantations 7½% Pref.	1906	£300,000	260,625	115,000	1	1					$28.00 sales
" " Ordinary *Fully paid.*				140,000	1	1					$25.00 sales
" " *Contributory.*				45,000	1	2/6					nominal
Pataling Rubber Estates Syndicate, Ltd.	1903	£30,000	20,000	20,000 *16*	1	1		7½% interim for 1905			£7 0s. 0d.
Ribu Planting Co., Ltd.	1904	$200,000	135,000	1,350 *17*	100	100					$270.00
Sandycroft Rubber Co., Ltd.	1904	$100,000	85,000	850 *18*	100	100		10% for 1905	257.50	255.50	$257.50 buyers
Selangor Rubber Co., Ltd.	1898	£30,000	26,300	26,300 *19*	1	1					£8 0s. 0d. sales
Singapore & Johore Rubber Co., Ltd.	1903	$100,000	91,500	150	100	100					$200.00 buyers
" " " " " " *Contrib*				850	100	90					$190.00 buyers
Sione Rubber Company, Ltd.	1905	$100,000	88,000	8,800 *20*	10	10					$16.00 sellers
Sungei Way (Selangor) Rubber Co., Ltd.	1904	£50,000	15,670	6,920 *21*	1	1					£2 0s. 0d. buyers
" " " " *Contrib.*				35,000	1	7/-					£1 10s. 6d.
Vallambrosa Rubber Co., Ltd.	1904	£60,000	50,000	50,000 *22*	1	1					£5 0s. 0d.
General.											
Fraser & Neave, Ltd	1898	$225,000	225,000	4,500	50	50	112,500	15% dividend for 1905	100.00	99.00	100.00 sales & sellers
Hogan & Co., Ltd	1904	$480,200	334,800	3,348 *23*	100	100	5,000	7% for 1904			5.00 sellers
H'kong and Shanghai Banking Corporation	1865	$10,000,000	10,000,000	80,000	125	125	10,000,000 *27* 9,500,000 *28* 250,000 *29*	35s. and 20/- bonus for ½ year ending 31-12-05			755.00 buyers
Howarth Erskine, Ltd.	1901	$2,400,000	18,000	100	100						142.50 sales
" " " 7% Pref.			6,000	100	100						112.50 buyers
Maynard & Co., Ltd.	1901	$34,000	34,000	3,400	10	10		15% for year ending 31-10-05	22.00	20.00	20.00 sellers
Riley, Hargreaves & Co., Ltd.	1899	$875,000	875,000	6,000	100	100	150,000	10% and 2½% bonus for year '04	125.00	120.00	120.00 sales
" " " " 7% Pref.				2,750	100	100		7% for year 1904			115.00 buyers
Singapore Cold Storage Co., Ltd	1903	$600,000	240,000	24,000 *24*	10	10					9.00 sales & buyers
Singapore Dispensary, Ltd.	1891	$30,000	30,000	600	50	50	19,000	12½% for year ending 31-7-04			67.50 sellers
Straits Ice Co., Ltd	1884	$200,000	200,000	2,000	100	100	22,000	5% interim for 1905			160.00 buyers
Straits Steam Ship Co., Ltd.	1890	$500,000	421,500	5,000 *25*	100	100	400,000 169,228 *30*	10% for 1905			147.50 sales & buyers
Straits Trading Co., Ltd.	1887	$3,000,000	2,500,000	250,000 *26*	10	10	700,000 1,021,395 *31*	10% & 5% bon. ½ yr. end. 30-9-05	46.00	45.50	46.00 buyers
Tanjong Pagar Dock Co., Ltd.	1864	$3,700,000	3,700,000	37,000	100	100	1,950,000	$6 for half year ending 31-12-05			480.00 buyers
Debentures. $											
Howarth Erskine Ltd. 6 per cent ... 600,000											2% prem. buyers
Singapore Municipal 6 " 400,000											3% prem. buyers
" " 5 " ...1,878,000											par buyers
" " 4 " ... 602,300											2% dis. nominal
Riley, Hargreaves & Co., Ld. 6 p. cent 225,000											2% prem. buyers
Tanjong Pagar Dock Co., Ld. 6 " 250,000											2% prem. buyers
" " " " 5 " 1,365,500											½% prem. sales

1 3,500 unissued
2 50,000 "
3 13,300 "
4 5,100 "
5 5,694 "
6 22,000 unissued
7 2,000 "
8 10,815 "
9 10,000 "
10 12,000 "
11 9,000 unissued
12 9,000 "
13 2,500 "
14 20,000 "
15 2,500 "
16 10,000 unissued Mort. £5,000
17 650 "
18 150 "
19 3,700 "
20 1,200 "
21 8,080 unissued
22 10,000 "
23 1,454 "
24 36,000 "
25 785 "
26 50,000 unissued
27 Special Gold Reserve Fund
28 Silver Reserve Fund
29 Insurance Fund
30 Sundry Reserves
31 Sundry Reserves

Special Edition

Devoted to the Industrial, Commercial and Agricultural Development of the Moro Province, under the American System of Colonial Government

THE FAR EASTERN REVIEW

COMMERCE ◈ ENGINEERING ◈ FINANCE

VOL. II. MANILA, P. I., SHANGHAI, AND YOKOHAMA, MAY, 1906. No. 13.

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Major General LEONARD WOOD, U. S. Army

First American Governor of the Moro Province, Philippine Islands, whose Progressive Administration of Civil Affairs has Opened up that Country to Immigration, and Industrial, Commercial and Agricultural Development

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GEO. BRONSON REA, M. E.
PUBLISHER AND EDITOR

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MANILA, SHANGHAI AND YOKOHAMA, MAY 1906

THE MORO PROVINCE

The Government of the Moro Province was established in July, 1903, with Major General Leonard A. Wood, U. S. Army, as governor.

In broad terms the policy of this government has been to aid, to the extent of its power, the development of agriculture, commerce, fisheries, and the timber industry, furnish cheap transportation to producers, and give equal opportunities to all, regardless of color or position in life. There has been no effort made to legislate in favor of any particular class, nor to check the enterprise of white settlers lest they outstrip the less progressive native.

Recognizing that the development of agriculture and industry are dependent, primarily, upon a good condition of public order, guaranteeing life and property, steps were immediately taken after the organization of the provincial government, by General Wood as commander of the military department of Mindanao, to bring slavery, slave raiding, and general lawlessness among the Moros, to an end. The conditions existing were grave, slave-raiding was rampant, and every form of lawlessness and outlawry existed, especially in the Island of Jolo, in the upper reaches of the Cotabato Valley, and in the country about Lake Lanao. Many Christian Filipinos had been carried into slavery, their settlements and *rancherias* captured and ransacked, women carried off, and murder and rapine indulged in against every natural and moral law. After 2 yrs. of active operations against the Moros, which culminated recently in the extermination of the last band of organized renegades, on the Island of Jolo, they have been forced to recognize the authority of the government. Those who led an open rebellion have been killed, and at present the Moros throughout the province are orderly, and, as a rule, law-abiding. For the first time in their history, they are paying a *cedula* tax and complying with the general regulations of the government. In dealing with these people the policy is to handle them through their native chiefs, who have been appointed headmen and made the duly authorized representatives of the provincial government. These headmen have their deputies, who report to them, and they, in turn, report to the district governor.

The entire province is divided into five districts, each under a governor, known as the district governor. The district governors are subordinate to the provincial governor, and under his executive control. Each district contains various sub-divisions of wild people, in many instances speaking different languages, and having different customs; consequently, the method of dealing with the people in each district, while in accordance with constituted principles, has varied in minor details. In general, the object, however, has been to promote peace and trade among them, and bring them into contact with the coast settlements.

Special agents of the district governors have been stationed among these people, and special efforts made to become acquainted with them, gain their confidence, and establish relations of friendship and good will. This work has been extremely arduous in the remote districts, and at times of almost insurmountable difficulty. The interior people, in many instances, are excessively timid, and it has been very difficult to even open communication with them. Their confidence once gained, a good understanding has been arrived at everywhere. Many of their customs were entirely inconsistent with our ideas of law and humanity, a condition of affairs that the provincial district governors have striven, by all means in their power, to gradually abolish, and to impress upon the natives the advisability of abandoning such practices.

In order to encourage trade, exchanges, or trade stations, have been established at various points, where the Moros, and other non-Christians, can bring their products and secure a ready sale. These exchanges, or markets, have been built by the government of the province, and are conducted under the direct control of officials whose appointment rests upon provincial authority. The results have been most encouraging, and people who have never come to the sea-coast for trade are now bringing in large quantities of products and disposing of them at prices better than they had ever received before, and there is every prospect that the work so well started by these exchanges will be extended, and become a very great factor in the development of the province.

The Moros, until recently, have exercised complete control over a great section of the province adjacent to the sea. They prohibited, absolutely, any fishing or sea traffic on the part of the inland natives, and cut them off from all supplies from the outside world: in short, they seized upon all trade between the very considerable inland population and the outside world, and lived on the profits. Being a much more warlike people than the people of the interior, they compelled the latter to bring in their products and in return gave them whatever they saw fit, usually only a small fraction of their value. These products, such as almaciga, gutta, rubber, hemp, and other jungle products, they sold to the outside world at an enormous profit. This procedure has been stopped. The interior people are now coming to the coast and doing their own trading, and the Moro has been compelled to enter the field on even terms with the other natives. There has been no attempt whatever to interfere with the Mohammedan religion, or to establish any too drastic reforms, except in the matter of the suppression of slavery, human sacrifice, and the autocratic powers of the datus, which made all people under their jurisdiction subject to their will

in every way—a condition which led to the most frightful brutality, immorality and abuses.

The subject of public education has been given very careful consideration. Public schools have been established in all the principal towns, a very carefully selected body of American teachers employed, as well as many native teachers. The schools are well attended, and the children are making good progress everywhere. Schools have also been established among the Moros, and in a number of towns of other non-Christians, with very encouraging results. The school question has been a difficult one, as the province had to deal with people of many tribes, speaking many different languages, a condition rendering it difficult to secure capable teachers who know enough of the language of the children to explain school methods and to start them on their school work in English.

Among the Mohammedans the situation has been a very difficult one. In the first place, their religious prejudices had to be overcome and their confidence gained before the attendance of their children could be secured. With this end in view, textbooks in the Moro language were prepared, a work of very considerable difficulty, as their language is written with the Arabic characters. These books, however, were prepared, and a portion of each day's instruction is given in Moro, using the Arabic characters, and the balance in English. This has necessitated the employment in each school of a native teacher, familiar with the Moro language, and in addition an American or English-speaking teacher, to give the necessary instruction in English. A normal school has been established at Zamboanga, for the purpose of instructing native teachers in English. An industrial school for Moros and Filipinos has also been started at Zamboanga. It will be seen that the question to be dealt with has been a complex and troublesome one, but the results are more than gratifying, and the prospect for the future is a very bright one.

Public works have been limited only by the funds available. The Island of Mindanao is about the same size as the Island of Luzon, and the Moro Province occupies considerably more than half of its extent. In addition, there are the islands of Basilan, Jolo, Tawi-Tawi, and many others. The amount of funds available for public works has been small. The main object has been to provide, in the first place, opportunity for commerce, namely, good wharves and landing places, to make passable the roads and trails between different towns, so that travelers can make journeys with safety in times of high water. This has necessitated the building of many bridges in remote and out-of-the-way places. Many school houses have been built, as well as provincial and district offices. A very considerable amount of road work has been done, especially in the vicinity of Zamboanga, where many miles of excellent road, with permanent bridges, have been constructed. A considerable amount of road and pier work has been done at Jolo and Siassi. At Davao, a road has been built from the landing place, through the town, and out beyond, and a considerable amount of money has been spent in opening up trails and establishing communication from Davao down the coast on the W. side of the bay. The re-construction of a road has been commenced from Overton to Iligan, and a first-class wagon road is being constructed from Overton to Lake Lanao. In Zamboanga, a provincial building of the first class is being constructed, the materials used being concrete and native hard woods. This building is believed to be of the best and most permanent type of building constructed in the Islands since the American occupation. The province, while solvent, has, as yet, a limited revenue. At the end of its first year of existence, it had a surplus of some ₱60,000 in the treasury; at the end of the second year it had a surplus of ₱130,000. The prospect of the revenue for the present year is even better than in the past, but the area to be covered with outlays for public works necessarily makes it a small figure in comparison with the large amount needed. Fortunately, transportation can be done by sea and river almost everywhere, thus doing away with the necessity, for the present, at any rate, for extensive road construction.

One of the principal objects of the provincial government has been, and is, to build up the agriculture of the province, realizing that the entire question of prosperity and development depends upon this. The undeveloped wealth of the province is very great, especially in timber and jungle produce, the former including most of the best woods in the Philippine Islands, in large quantities. The enormous Island of Mindanao is practically covered with forests, in some sections unbroken for hundreds of miles. At the present time, the only timber which is readily available is that which is near the large rivers and on the sea-coats, where it is abundant. The development of the lumber industry in the interior of the island will necessarily depend upon the construction of railroads. There is also a vast amount of lumber on the Island of Basilan, and on all the small islands of the Sulu Archipelago, much of it of the superior grade. In addition to the lumber, the forests, in many sections, abound in the rubber vine and the gutta tree. Large exportations of crude gutta percha and rubber have been made from Cotabato in times past, and, now that public order has been established in that region, these exports are beginning to increase rapidly in volume. In addition to the wild rubber and gutta, steps are being taken to develop these industries systematically, especially the cultivation of rubber, to which industry this province is singularly well adapted. Many rubber plantations are being started, and the results are most encouraging. The young trees are doing especially well, and the outlook for an early, and abundant, production is excellent. The forests, also, abound in almaciga, large amounts of cinnamon and allspice bark, bejuco, and other jungle products, all, as yet, practically unworked. The native tribes of the interior are timid, and it is difficult to bring them into contact with the coast traders, but with the establishment of public order, and the suppression of slave-catching and slave-trading, the confidence of these people is rapidly growing, and the output is being considerably increased.

Throughout the S. and E. coasts of the province large amounts of hemp are being put in. The product is of excellent quality, and the crop large. This industry has been especially pushed in the neighborhood of Davao, with most encouraging results. There has been a slow, but steady, flow of white settlers there, all of whom have gone into this industry, and all seem to be much encouraged by the results obtained. Such also is true of other plantations on the Zamboanga Peninsula.

Cacao, also, does very well, and is a very profitable crop to handle.

The success of the cocoanut industry in Mindanao is well known. This industry has been flourishing for many

years, and is one of the principal sources of revenue of the province. Planters are putting in large amounts of cocoanut trees everywhere, and this industry is steadily increasing. The matter of establishing a factory for the manufacture of rope out of the fibers of the cocoanut is under consideration. If this is undertaken, a vast amount of material, now going to waste, will be made the source of considerable income.

Rice, and other native food products generally, thrive in all sections of the province.

There have been a number of coal mines located, which turn out a fair quality of coal, although the location is such that it has not been found, as yet, profitable to work them.

There is an unlimited quantity of mango trees, which produce a bark most valuable for tanning and dyeing. This industry, so profitable in the Malay Peninsula and portions of Borneo, is, as yet, entirely undeveloped in this province.

The sea swarms with a great number of valuable kinds of fish; in fact, it is doubtful if there is any section of the Philippine waters where fish are more abundant or of better quality. The pearl fisheries in the Sulu Sea are valuable and extensive. The most marketable product is the pearl shell. The pearl, while valuable and much sought after, is, after all, a secondary object. Wise legislation has been enacted for the protection of the young oysters, and every effort is being made to so conduct and safeguard these fisheries as to build up the output. The tyrannical measures until recently enforced by the Moros, rendering pearl fishing a hardship, and those who engaged in it subject to all sorts of exactions, have been brought to an end, and the industry is now open to all who comply with the legal requirements as to fishing.

In brief, this whole section of the Philippines presents a field of great and almost untouched natural wealth, which needs only the energy of the settler to develop it. The energy and force of the newcomer is transmitted, to a more or less extent, to the native, who catches the enthusiasm and adopts, to a certain extent, the more modern methods, and thereby increases his output. The wild people are, as a rule, willing workers, and when properly handled give good results. They are timid, and require to be handled with kindness. The Moro is a ready worker, anxious always to make money, and strong and energetic. He is, perhaps, the best laborer found in the Philippines.

The small section around Lake Lanao produces, yearly, over 100 tons of most excellent coffee, and there is ample opportunity to multiply this crop many times.

Sugar grows well, and there are large areas especially adapted to its growth. Among these, the Cotabato Valley is pre-eminent. There are many hundred square miles of superior sugar land, awaiting only a condition which will enable corporations to occupy enough land to make the erection of the mill feasible. The rainy season here in the southern islands is of such character as to give good results from cane. There are no long periods of uninterrupted rain, but heavy daily showers, followed by bright, strong sunshine. The permanent dry season is well established by the end of December, and lasts until the succeeding May; conditions closely resembling those which exist in Cuba, and which are most favorable for the development of the best quality of cane.

The foothills of this valley are excellent for coffee, hemp, and cocoanuts, and the bottom lands for cocoanuts, as well as sugar. Peanuts and camotes grow in the greatest abundance.

A much more liberal land law is needed. The present one is almost prohibitive to the development of the province. Forty acres as a homestead, where thousands of square miles are unoccupied, is an unwise limitation, and one which paralyzes industry. The amounts which companies and corporations can obtain are also altogether too small, and absolutely prohibit the development of the sugar industry on a large scale. The homestead area should be increased to 300 acres, and the area which can be purchased or leased by corporations to a maximum of 10,000 acres. Many thousands of square miles of the richest and most valuable land are lying, as they have lain for centuries, untouched and undeveloped, and no useful purpose served by the maintenance of legislation which prevents the development of this natural wealth.

One of the most important things to settlers has been cheap and regular freights. With this in view, the province has subsidized one steamer, and in the future will probably subsidize another under an agreement which fixes the rate for freight and passengers. Guarantees have been given to a line from Hongkong to Australia, which insures the direct shipment of goods from Chinese ports to Zamboanga, thereby avoiding the long delay and increased expense of shipment through Manila.

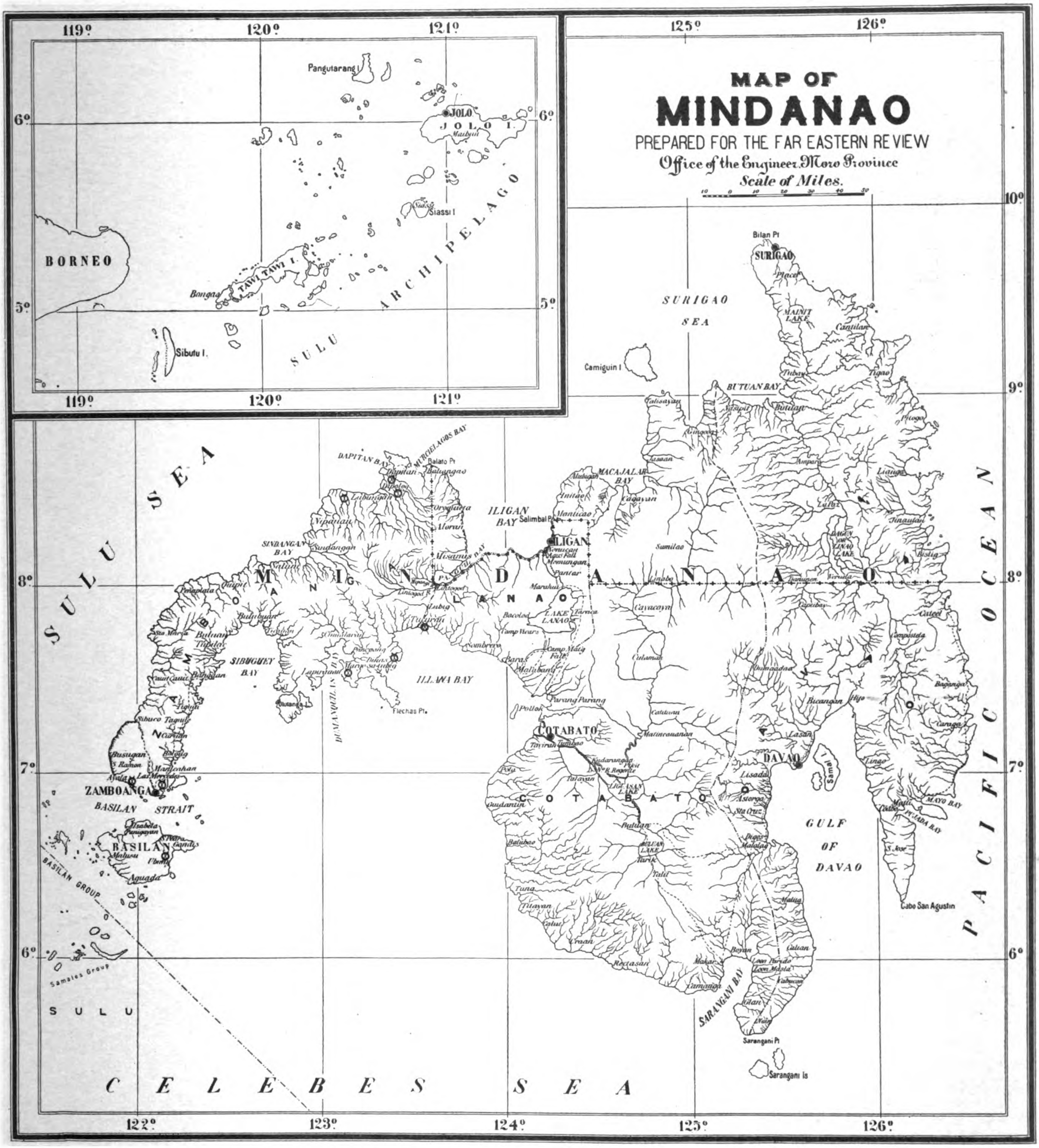
The climate is healthy. White people do well here, and there is no climatic reason why white people should not remain here indefinitely.

There is no part in the Philippine Islands in which industry and small capital can secure better results than in the Moro Province. The public disorders are at an end, and the opportunities here are not found in the other provinces. The opportunities to the settlers are excellent.

The province desires emigrants, and believes that the federal government should aid by furnishing transportation to a desirable grade of emigrants. All that needed for development here is the energy which comes with the settler, and, as stated before, the effect of this energy is excellent upon the native; it opens his eyes to the results which can be obtained from modern methods, combined with industry.

The controlling influences of the Moro Province is, in every sense, American, and while everything has been done, and is being done, to push forward the native and to develop him to his fullest extent, a line of effort in which it is believed this provincial government has exceeded any other, yet no effort has been made to curtail the abilities of any race better prepared for rapid development. In other words, this country is open equally to the white man and to the native, and the policy is to let the best man win. It is believed that the native, with the benefit of long residence, through habituation to climatic influences, and knowledge of the soil, is so prepared for competition with the white man that he, at least, ought to be willing to meet him on even terms.

In comparison with other countries in the Far East, it is believed that the Philippines, and especially the Southern Philippines, as represented by the Moro Province, offers the best field for white settlers, at present, in the East. To reiterate, the general policy of the Government of the Moro Province is to give all its people security of life and property; its children an opportunity to obtain an average education, and to all its people, regardless of color, an opportunity to succeed in accordance with their ability, and not necessarily in accordance with their color.



THE ABOVE MAP was drawn from the latest data at the disposal of the Provincial Engineer. Only places of importance are shown. A glance will show how well watered is the whole province. Practically all of the land along the coast, except on the extreme Eastern portion of the island, is available for settlement.

LEGEND

+··+··+··+··+··+ ·+··+··	Boundary of Moro Province
—··—··—··—··—	Boundary of District.
- - - - - - - - - - - - - -	Trails.
******************	Proposed railroad between Iligan and Lake Lanao. This road may 'be extended around the least shore of the lake, and thence south to Parang Parang on the indicated trail.
⊗	Location of Moro Exchanges in Zamboanga District.

Moro Province in General

Attractive System of Colonial Government which has for its object Development of the Country and the Education of the Moslem and Malay Natives for Future Endeavor

Photo by Aeronaut Gibbs.

A TYPICAL MORO RICE POUNDER

UNIQUE PROVINCIAL GOVERNMENT

(By Captain Langhorne, U. S. Army.)

The Moro Province was created June 1st, 1903, by an act of the Philippine Commission. It embraces the greater part of Mindanao, the Island of Basilan, and the whole of the Sulu Archipelago and adjacent islands. North-eastern Mindanao, above the 8th parallel of latitude, with the exception of a small portion, has previously been organized into the two provinces of Surigao and Misamis.

For purposes of administration, the Moro Province is divided into five districts, named from W. to E., Sulu, Zamboanga, Lanao, Cotabato, and Davao. The province comprises approximately 40,000 sq. ms. of very rich, well-watered, diversified country. The population is approximately 500,000, composed of some 28 different tribes with different languages and many distinctions or differences. Quite a number of so-called Filipinos, embracing Visayans, Tagalogs, etc., live in the coast towns. Several hundred white men, embracing Americans, Spaniards, Englishmen, Dutchmen, and Frenchmen are engaged in business in the towns or scattered about as planters.

EXECUTIVE BRANCH OF THE GOVERNMENT.—The executive branch of the government consists of the provincial governor and the provincial secretary, who, by law, is acting governor when the governor is not present for duty. The provincial governor must see that the laws are faithfully executed by all officials of the province, districts, sub-districts, and municipalities. Through the district governors he controls the municipal police of the various municipalities, and through the district director of Philippine Constabulary he may direct the use and control the movements of the insular constabulary. By and with the advice and consent of the Legislative Council he appoints the district governors, district secretaries and district treasurers, and all subordinate officers and employés of the provincial government, under the provisions of the Civil Service Act.

The provincial secretary, during a vacancy in the office of the governor, or during the governor's disability, or absence from the province, performs the duties of governor. By direction of the governor he makes inspections of various affairs, and performs such other duties in reference thereto as the governor may authorize. He must acquaint himself, as far as practicable, with the language and customs of the Moros and other non-christian tribes, and from time to time make reports and recommendations for their betterment. He is the custodian of all records and provincial documents, and discharges all duties pertaining generally to that of the office of secretary. He also acts as secretary of the Legislative Council, and discharges such other duties as the council may by law provide.

DISTRICT GOVERNMENTS.—Each district has a district governor and a district secretary. The district governor discharges his duties under the orders and supervision of the governor of the province. He acts as sheriff in the execution of all legal decrees of the Court of First Instance and the district courts. He exercises the same powers with respect to discipline, suspension and removal of the officers of the municipalities organized in his district, which the provincial governor under the general Provincial Government Act and its amendments exercises over the municipal officers of the municipalities of his province, with a certain amount of exceptions. An appeal from his action in this regard lies to the Governor of the Moro Province under certain regulations. He is required to inspect his municipalities at least once every 6 mos., make report of their condition, and from time to time make such recommendations to the governor as he may deem proper for the best interests of his district. He inspects the municipal police and has power to discharge any person unfit to serve therein. He has power to direct the police of one municipality to be used in any other part of the district, and to discharge such other duties as may be imposed upon him by acts of the Legislative Council. He is directly in control of all Moro and Pagan tribes. By an act of the Legislative Council the district governor divides his district up into a number of tribal wards. Over these he appoints headmen or deputy headmen. These native chiefs report direct to him. The native headmen wear distinctive decorations—badges of office—and have certain powers to control delegated to them by the district governor. The latter organizes the police of the various tribal wards, and through the chiefs obtains immediate information as to crimes committed, etc., and takes the necessary judicial action. He proposes ordinances for the government of the native tribes to promote the prosperity, good order, morals, peace, comfort and convenience of the tribal wards of his district and the inhabitants thereof, and for the protection of property. He and the district secretaries are the *ex officio* justices of tribal ward courts, which are established by an act of the Legislative Council. The district governor calls meetings of the chiefs to act as an advisory council. He settles by arbitration the disputes between different tribes. The council of chiefs confers with the district governor upon matters of public concern, and proposes such measures affecting the interests of the people, as they desire.

DISTRICT GOVERNOR A MEDIATOR.—At such meetings, it is the special duty of the district governor to explain to the headmen assembled the purpose of the United States to establish among them a just, stable, and sovereign government in which they shall be afforded the opportunity to manage their own local affairs to the fullest extent of which they are capable consistent with the maintenance of law, order, and loyalty, and in which the exercise of their customs and religion will not be interfered with unless contrary to law or repugnant to the usages of civilized nations; to explain to them the advantages of civilized municipal government, and to endeavor to awaken and foster an interest in the construction and maintenance of buildings, schoolhouses, roads, trails and other public works for the common use and benefit of the inhabitants of their respective districts. The advisory council may, with the approval of the district governor, provide for certain taxes and grant certain licenses.

The district governor settles most difficulties between the tribes. This is done by personal influence and arbitration. Few outside of the province can appreciate the great amount of work done by the district governors, and the extent of the influence they exercise. They are required to constantly move about the country in boats and in jungle trails in visiting the native chiefs. To cite an instance:—

About 2 yrs. ago the present district governor of Davao received word that a mountain tribe

of Bilanes had made a descent upon the Tagacaolos and had murdered two or three of the latter. The governor at once proceeded with one or two soldiers and 14 Tagacaolos some 50 ms. into the interior and suddenly appeared before the house of the Bilan chief, who had never before seen a white man. His first remark to the district governor was, "Why, you look just like I do," which the district governor says was quite true, this Bilan chief, Maynib, having brown eyes and hair and rather light complexion. After a few preliminaries, the district governor said he had come up to see about the killing of some Tagacaolos the Bilanes had done. The chief replied, "Yes, but we are not nearly through yet; we have some 47 more to kill to get even for a raid that they made upon our tribe some years ago." The district governor then explained the fact that the Americans had taken over the government and that such reprisals could not be allowed, and invited the chief to a conference to be held at Santa Cruz, on the Gulf of Davao, on a certain date some few weeks ahead, which was carefully recorded by tieing the proper number of knots on a string. The district governor then proceeded to visit other tribes which were interested in this vendetta warfare, and on an arranged date held a conference of five tribes. He appointed a judge from each tribe, who swore by his own peculiar customs to well and truly try and determine the case, with the district governor as referee. Witnesses from five tribes were examined. They went back over 10 yrs. of murders, thefts, etc. A remarkable fact was that the witnesses all told the truth as far as could be determined, and quite frankly and openly spoke of killings and reprisals. A table was made showing the depredations of each tribe against the others, like a clearing house sheet; like crimes were struck off, and a balance was left against two tribes who had committed more depredations than the others, which they agreed to settle by the payment of 200 plates and three big gongs. Thus were cleared and paid off all debts of the past and the five tribes agreed to live together in the future. They shook hands all round and enjoyed the festivities arranged for them. This is but one of the many instances that could be cited in the various districts did space allow.

The district secretaries act as district governors during the absence of the latter from the district, or in case of a vacancy, and in general perform similar duties for the district as that performed by the secretary of the province.

In addition to the above, the Legislative Council has provided six assistants to the governor. These assistants might well be called understudies. They are assigned to work under the district governors, and go out among the wild tribes, and, under his instructions, endeavor to benefit them in every way. As a rule, they are appointed justices of tribal ward courts, and they exercise such functions of district governors as may be delegated to them.

THE LEGISLATIVE BRANCH.—The legislative branch of the province consists of the Legislative Council, which is composed of the governor, secretary, treasurer, engineer, attorney and superintendent of schools. The council is authorized to pass such laws, subject always to annulment or amendment by the Philippine Commission, as are not inconsistent with the organization act, or acts of congress relating to the Philippine Islands, as may conduce to the welfare of the people of the Moro Province. It appropriates for all expenses of the provincial government, makes provision for the necessary employés, provides for the raising of revenues by the imposition of taxes on property, persons or businesses, by the imposition of excise taxes or stamp taxes, etc.; provides a school system, enacts laws for the creation of local governments among the Moros and non-Christian tribes, conforming as nearly as possible to the lawful customs of such people; provides for certain tribal ward courts; for the abolishing of slavery; for the construction, repair and maintenance of roads, bridges, ferries, public buildings, etc.; provides a municipal code in its application to municipalities with the Moro Province, etc.

The members of the Legislative Council are appointed by the governor general of the Philippine Islands. In addition to legislative duties, the treasurer, the engineer, the attorney and the superintendent of schools are heads of their respective departments.

The wisdom of the organization act has been demonstrated. It was recognized by the Philippine Commission that the conditions in these S. islands were very much different from those in the N. islands, and they have fully authorized the local government to meet the local conditions and to adjust them, and have aided the local government in many ways.

The gradual change from the army control to a civil one has been facilitated by the appointment of army officers in the various positions of governor, secretary and provincial engineer. Army officers were also appointed as district governors, and in several cases as district secretaries. A captain of constabulary has been promoted to be district governor of Lanao within the past 2 mos. It has been the constant aim of the government to appoint civilians as understudies for these positions, and it is believed that a civil list of good men who can start in at the bottom, learn the dialects and customs of the various peoples and perfect themselves in the administration of laws and gradually work up to the higher positions, will be for the greatest benefit of all concerned. For many years to come it will be to the advantage of the white settlers to have good order kept and laws administered by a set of competent and trained officials, in order to enable the settlers and business men to devote all their attention to the building up of their plantations and commercial concerns under the many natural difficulties which exist, and to leave politics until some future date when the revenues of the province shall have increased to a much larger amount than at present. Of the natives the great majority are savages or but removed from that state; a small number are semi-civilized, and a few are quite intelligent and have some education. As a class they can not read laws and can not understand them. Therefore personal influence and control of and by the officials are all important for their material development and protection. The natives respect and appreciate the strong official over them who works for their betterment.

The scheme that is now worked to is to appropriate 50 per cent of the revenues for public works and works of general utility, and about 20 to 25 per cent for schools; to keep the cost of the executive branch down to 10 or 12 per cent of the total expenditures, and to use the remainder for contingent and unforeseen expenses. The success in economical administration has so far been very gratifying. The aim is to so expend the public funds as to construct as many permanent works as the revenues will permit, to encourage trade and promote agriculture, and to increase in every legitimate way the exports from the province.

NEIGHBORING FOREIGN COLONIES COMPARED.—Comparatively near the Moro Province are the colonies of European countries, all of which are run under different policies:—Celebes, British North Borneo, Sarawak, and the Federated Malay States. The last three named are about the same.

The Celebes have been occupied by the Dutch for about 250 yrs. In the N. portion the people have been Christianized, and throughout the whole they have very good schools. They have a system of governor, residents, and controllers, and under them the native chiefs. For the last 60 yrs. their administration has been excellent. They have a splendid system of roads, bridges, and public buildings. The natives (*Poillon's Report*) perform labor for their communities from 14 to 32 days per year, or pay a small tax in lieu thereof. This labor is for their material benefit in giving them excellent roads and irrigation systems. The governor, residents, and controllers correspond to the governor, district governors, and assistants of the Moro Province. The people appear very happy and contented and are kept constantly at work. The imports are very large and under constant supervision the people have many material comforts.

The Government of the British North Borneo is the government of a chartered company. There is a governor, residents, and district officers who endeavor to develop the country. Their acts are subject to the control of the committee of stockholders in London, and the revenues of the country must go partly to pay dividends on the investment. While British North Borneo has many good officials, it is not believed by experts on such subjects that the system is one which will last for a long time, and there will probably be a change for the better.

Sarawak is Rajah Brooke's country, and has been a mild despotism for the last 60 yrs. under two cultured and most kindly disposed British gentlemen. The first rajah, Sir James Brooke, was succeeded in 1868 by the present rajah, Charles Johnston Brooke. Sarawak has a system of resident and district officers, and the country is run for the entire benefit of the natives. In Sarawak but few roads are needed, the waterway being the sea and the many navigable rivers which run in all directions through the long narrow strip of country which Sarawak embraces. The revenue of this colony is a little over ₱2,000,000 per year.

The residents have great power in these three colonies. Each of the latter contains many different tribes with various dialects. The officials all speak several dialects, Malay being the language of the courts, and the principle is followed that the more intelligent official classes should learn the language or dialects of the supposedly ignorant classes, and to be able to communicate directly with them without the aid of interpreters, and to more quickly learn their customs and peculiarities and thus be in a better position to trade with them.

The Federated Malay States, in the Malay Peninsula, as their name indicates, are a union for their mutual benefit of four native states. These states are independent and are governed by residents and a staff of able assistants, although the government is nominally that of the sultan or chief of each state, and his advisers. Each state has a legislative council composed of the sultan, the resident, one or two native chiefs and a couple of British officials. These bodies make the laws, which are issued in the name of the sultan, attested by the resident. For the sake of economy there is a central head composed of the resident-general, the director of public works, attorney-general, inspector of schools, etc., who serve to make uniform the laws and regulations for the government of the four states as a whole. The first two of these states to receive British advisers—called residents—were Perak and Selangor, and that was only about 30 yrs. ago. The last state, Pahang, received an adviser only about 12 yrs. ago. The federation was made 10 yrs. ago, and yet these British officials have managed to bring law and order among a set of land and water pirates, who for centuries had been a menace to commerce and trade. Now the country is covered with excellent metalled roads, amounting to many miles; with harbors and docks of the most modern type; over 350 ms. of railroads—all paid for out of surplus revenues. The natives enjoy the great liberty and every comfort that prosperity brings. The native customs are not interfered with and the dignity of the chiefs is upheld. The land is all held in trust for the people and leased to settlers. Steamship companies are subsidized and give good service and low tariffs. A system of subsidizing automobile service to carry mail and passengers over the beautiful roads has been inaugurated. The taxes are very low; every kind of industry is fostered. There are magnificent plantations of rubber, cocoanut, sugar, etc. The natives have comfortable homes and quantities of fruit trees, and enjoy to the fullest extent their natural proclivities for sport. The revenue amounts to over ₱22,000,000 per year, and all this has been accomplished by a handful of able British advisers.

In these states one native language, Malay, is in general use, although there are several pagan tribes in addition to the Malays, and certain officials have had to acquire the pagan dialects, while others have been compelled to learn the different dialects of Chinese represented among the Chinese settlers.

COURTS OF PROVINCE ARE SPECIALLY ORGANIZED FOR MOROS

HON. J. S. POWELL,
Judge of the Court of First Instance, 14th Judicial District (Moro Province.)

The province spends a considerable amount on the administration of justice. Tribal ward courts, so-called, have been established in many districts, and it is interesting to note that the Moro, little by little, is giving up datu justice and coming in to the white man where, while he may get what to him appear strange decisions, he receives a *square deal and* knows that the magistrate has no family connections or personal interests to be considered. Appeals in every case lies from the tribal ward courts to the Court of First Instance. All natives convicted by the Court of First Instance, in the province, are confined in the provincial prison, called Calarian, just outside of Zamboanga. The insular government pays the salaries of the judges and clerks. The province pays all their expenses, and the fines accrue to the insular government

In order to open up new markets and to give merchants and others the advantage of low freight rates, the provincial government guarantees a certain amount to steamers plying between Hongkong and Australia for one stop each way per month. The amount paid by the province was about ₱11,000 the first year. In addition to the great advantages to the merchants and the residents of the province, the immediate returns amounted to over ₱29,267.25 in money.

The planting of hemp, copra, rubber, and fruit trees has increased materially, while the exports of sea and jungle produce have kept pace with the planting. In the District of Davao many millions of hemp plants have been set out, the output of hemp has constantly increased, and will be much larger in the future. The increase of the exports from the District of Sulu has been gratifying and now some 1,000 piculs of hemp are there exported each month.

A few roads and trails will have to be constructed in the Island of Jolo and better water transportation arranged.

The great obstruction to the development of the District of Cotabato was removed during the present year by the death of Datu Ali, who, in his opposition to the government and through his influence and large following, created a stagnation in trade and agricultural pursuits in that rich valley. Cotabato is one of the richest valleys in the Philippines, sugar, cocoanuts, and rubber all doing well there, and a few years will show an extraordinary increase in its material wealth.

In the District of Lanao, on the Iligan side, many hemp plantations have been started and cocoanut trees set out. The exportation from Malabang of a very high grade of coffee in the lake region, grown and marketed by the Moros, amounted in 1 mo. to 140,000 lbs. Back of Malabang and now cövered by a dense jungle, is a large section of the richest volcanic soil which is peculiarly adapted to the planting of tropical plants, such as hemp, rubber, vanilla, and spices.

The District of Zamboanga exports large quantities of hemp and copra from the N. portion about Dapitan, and the exportation of these products from Zamboanga itself has increased, while, due to the industry of the Moros, acting under the inspiration of the district governor, many new products from sea and forest have been set out.

Settlers are doing well in all portions of the province, although there is room for many more, especially for men with capital that will enable them to work and plant for 3 yrs. while awaiting the returns from their investment. The government has encouraged rubber planting by purchasing seeds and seedlings and distributing them among the settlers. San Ramon farm, turned over to the province in November, 1905, was established by the Spaniards many years ago, and now serves to furnish seedlings to all planters in the province who desire to purchase the same. Careful statistics are being kept of the experiments made in growing various plants. The provincial secretary's office has distributed information throughout the province to as many planters as practicable concerning the cost of handling the various plants and the results of experience in other tropical countries in the planting of rubber, hemp, etc.

In many parts of the province cattle have done exceedingly well, and the lumber trade is developing as fast as the capital of the lumbermen will permit.

Much attention has been given to sanitation and the preservation of health, with satisfactory results. For instance:—A case of smallpox was discovered in the most populous Moro section of Zamboanga and immediately reported. It was at once isolated and no more cases occurred. This has happened in several municipalities, and shows the effect of the general vaccination carried on by the province. By an arrangement with the army, indigent natives requiring hospital treatment are sent to the army hospitals, their cost of maintenance being paid at a uniform rate. Army medical officers have gladly acted as health officers for the province and municipalities, and by performing needed operations have been the means of saving many lives, and curing many of the injured and sick.

The organization of tribal wards has been carried out so that nine-tenths of the tribes have now been organized with good results. An increase in the number of murders and other crimes reported has taken place, but this is probably due to the better organization of the savage people, and consequently fuller reports as to the crimes committed rather than to any increase in the number of offenses. It is undoubtedly true that better order now prevails than before the organization of the tribes. Some years ago it was unsafe for even large numbers of troops to travel, now the provincial officials go about alone. For instance:—In all parts of Lanao, the assistant to the governor has visited and remained weeks at a time with chiefs who were formerly hostile. The troops have so efficiently responded when called upon to enforce order that the natives have become convinced that it is impossible to resist the civilizing influence, and the necessity for the use of troops is becoming less and less. In case of small infractions of the law, constabulary have been used. In those expeditions in which they have taken part with the regular troops they have borne themselves with great bravery and have been a credit to their officers. The latter have assisted the provincial and district officials in various ways.

The labor question is at present arranged most easily through the help of the district officials, the planters working to aid the policy of the government. If within a few years the number of settlers materially increases it would be necessary for the government to aid them by importing suitable labor.

At present there is a lack of capital in the province and firms with sufficient money can establish themselves very profitably at Zamboanga, where rents, freights and labor are comparatively cheap, and buy the constantly increasing exports from the various districts and ship them direct to foreign ports. In return they could sell to the planters, merchants and other settlers the goods which they need and make handsome returns, as the money would be turned over every 3 mos.

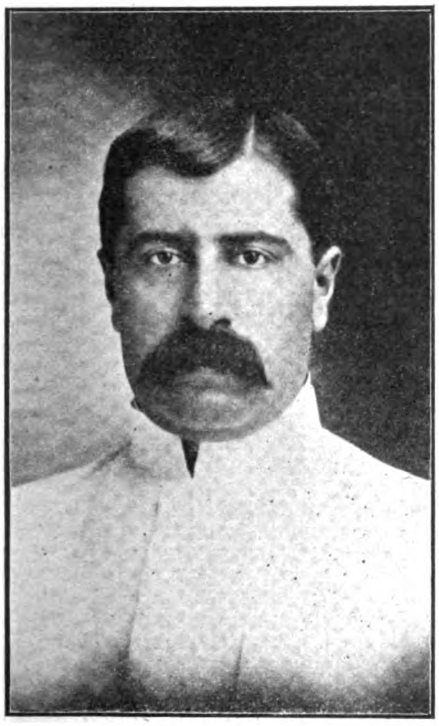
CAPTAIN GEORGE T. LANGHORNE

Captain George T. Langhorne, secretary of the Moro Province, is a native of Virginia. He graduated from West Point in 1889 as first captain of his corps, and after receiving his commission was actively engaged in the field against the Mexican violators of the neutrality laws up to 1893, when he was appointed aide to General Frank Wheaton, serving with that officer later in the Department of Colorado. He was appointed military attaché to Belgium in 1897, but at the outbreak of the Spanish-American War was returned to the United States and went to Cuba on staff duty in time to witness the fall of Santiago. After going through the Porto Rican campaign he served in the Dakotas as adjutant of the 1st Cavalry. In 1899 Lieutenant Langhorne was appointed aide to General Davis in Porto Rico, and remained there in charge of the office of civil affairs until fall, when he received his commission as captain in the regular establishment,

CAPTAIN G. T. LANGHORNE,
11th U. S. Cavalry, A. D. C., Secretary of the Moro Province.

and was commissioned major in the 39th U. S. Volunteer Infantry. He served with his regiment in Luzon, going home in command when it was mustered out of the service. Organizing a troop in the then-new 11th Cavalry, he returned to the Philippines in 1902. Later he was aide on the staff of Major General George W. Davis until the retirement of that officer. Being appointed aide on the staff of Major-General Wood he returned again to the Islands in 1903. When the Moro Province was organized Captain Langhorne was appointed secretary, and has done splendid work in that capacity. During the absence of General Wood on many occasions Captain Langhorne has acted as governor of the Moro Province. In the meantime he has found time to travel through the Federated Malay States, Borneo, Sarawak, and Java, China, and Japan, and to make voluminous notes that have been of great value to the government.

PROGRESSIVE EDUCATIONAL SYSTEM



Dr. NAJEEB M. SALEEBY,

Superintendent of Public Instruction, and Member of the Legislative Council

The educational branch of the government of the Moro Province is organized according to a plan somewhat distinct from that followed in the northern provinces. The chief of this branch is here called the superintendent of schools. In this official are vested powers, for the most part, coordinate with those exercised in the N. by the director of education.

The superintendent of schools is assisted in his work by an assistant superintendent and such deputy superintendents as he may appoint among the American teachers of each district. As a matter of practice, deputy superintendents are appointed for the districts of Davao, Lanao, Cotabato, and Sulu. Their duties consist, in conjunction with their work as teachers, in a limited amount of office work, occasional inspections and the general oversight of the educational work of their respective districts.

The American teachers needed in the Moro Province are obtained by requisition upon the director of education, and the administration of the civil service law in its application to these teachers as well as to all the officials and employés of this province, is left with the Civil Service Board in Manila.

Apart from these particulars, however, the province is practically independent in school matters. The courses of study to be established, the texts to be used, the supplies to be purchased, the teachers to be employed, and their salaries, duties and stations, are matters left wholly to the provincial authorities. This difference in administration does not mean, indeed, that there has been any marked deviation from the course and methods of instruction followed by the Manila authorities. Changes have been made only where the advantages of this course were plainly apparent. For example, Spanish and Moro have been admitted into the curriculum, to a limited extent, in localities where these languages constitute the vernacular of the people, and the result has been an immediate increase of popular interest in the schools.

Another feature of the educational system of the Moro Province, noticeable by reason of its dissimilarity from that which obtains in the other portions of the archipelago, relates to the financial administration of the schools. The Organic Act of the Moro Province empowers the Legislative Council "to enact laws, in its discretion, for the organization and support of a public school system," and the Legislative Council, in Act No. 17, provides that all public schools of the province "shall be supported and maintained by appropriation from provincial funds." There is no special school fund in the Moro Province. All the revenues accrue to the general fund and such part as the council may deem sufficient is applied to school purposes. This makes it possible to determine in advance the exact amount of funds which will be devoted to school purposes and to calculate the expenses accordingly. Here, there is no long waiting for salaries, the payment of which depends upon the slow collection of local taxes; no school debt remaining unpaid from year to year, no coaxing of municipal councils for an additional appropriation for school purposes, no dependence upon the assistance of indifferent municipal officials. Salaries and other school expenses are paid promptly by the district treasurers and their deputies. The increased loyalty and enthusiasm which this promptness arouses among the native teachers of the province are assets in the administration of schools which are duly appreciated.

About 24 per cent of the expenditures of the province have been for school purposes. There are 56 primary schools evenly distributed throughout the whole province, extending from Cateel on the E. to Bongao in the SW. and Iligan and Dapitan in the N. All municipal centers and the larger barrios are provided with primary schools.

Equal opportunity for education has been provided in many places for the Moros and pagans. Twelve schools are at present attended by Moro pupils and two by Bagobos All these schools are fully equipped and well-housed. In many localities the school building stands out conspicuously as the best house of the pueblo and its vicinity.

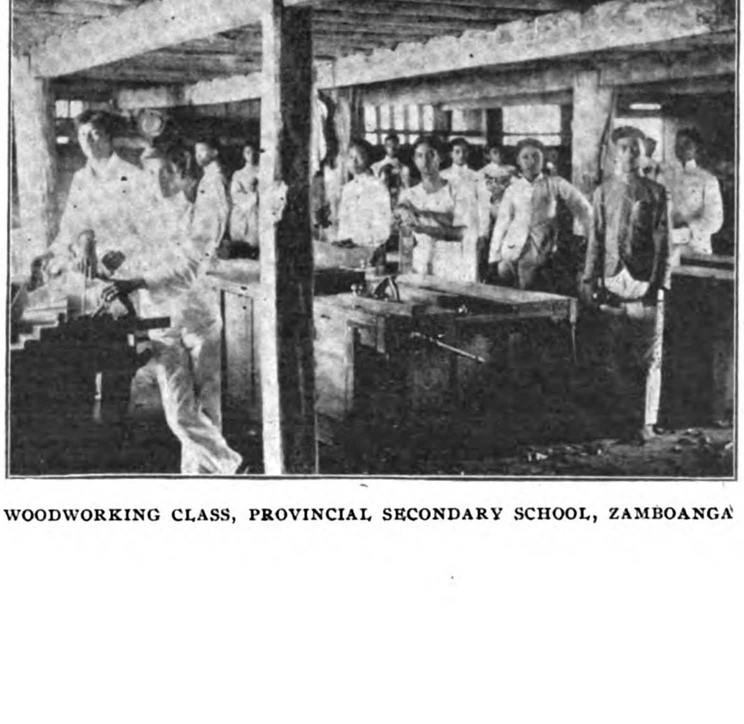
In Zamboanga a beautiful and spacious lot has been reserved for the projected school buildings of the town. Working plans for these buildings are being prepared with the intention of beginning construction before the end of the present fiscal year.

The province employs about 30 American teachers and 68 native teachers. English being made by law the basis of all education, all instruction, except that of Spanish and Moro, is given in the English language. American teachers are on this account retained in charge of the principal primary schools. This in many localities, especially the capitals of the districts, affords a good opportunity for American children to continue their education uninterrupted by their stay in the Philippine Islands.

The necessity for higher education was recognized early and a provincial secondary school was established at the beginning of the first school year following the organization of the province. Instruction in this school is conducted with a view to its application to the practical industrial problems of the province. Considerable attention is given to the study of plant and animal life, with practical instruction in gardening and agriculture. With the organization of a school for trades, manual training has been introduced and given undoubted prominence. Every pupil of the provincial secondary school will be required in the future to give one hour daily to woodwork, mechanical drawing, or actual attendance and work at the machine shops.

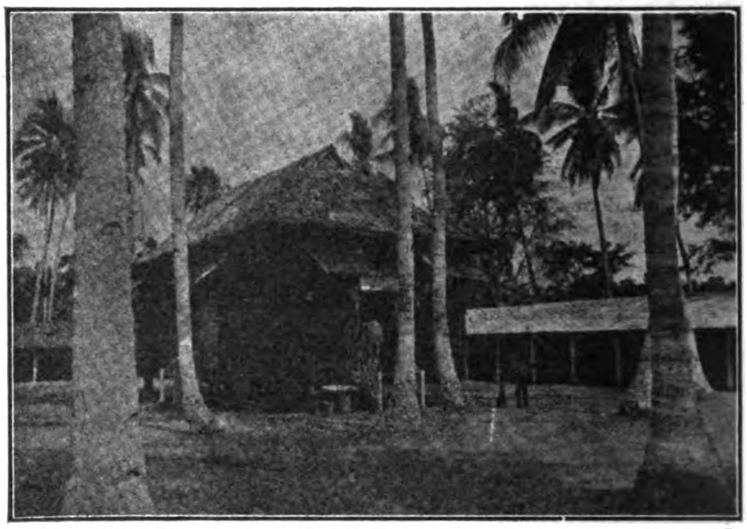
For the purpose of introducing needed industries into the province, practical trade classes have been organized in sewing, embroidery, dressmaking, weaving and chairmaking. Here as well as in the woodwork and machine shop, equal opportunity is afforded the public as well as the pupils of the schools, to acquire a practical and needed trade.

It is further intended to extend industrial instruction to the lower grades of the primary course, giving it the same weight and value as English and arithmetic and geography. With this in view all native teachers have been required to take such courses in their normal vacation institutes as they may be able to carry on in their schools without too much difficulty. Along with such endeavor, it is proposed to develop such industries as may be most suitable for the locality of the school and to foster a desire among the natives of the province to exploit and utilize the natural resources of their forests and agricultural lands.



WOODWORKING CLASS, PROVINCIAL SECONDARY SCHOOL, ZAMBOANGA

MORO EXCHANGE SYSTEM IS ONE OF THE BEST CIVILIZERS



LODGING HOUSES FOR MOSLEM TRADERS AT THE MORO EXCHANGE, ZAMBOANGA

One of the governmental agencies for the humane development of the savage Moslem and the pagan tribes of the mountains has come to be known as the Moro Exchange System.

Conceived in a spirit of earnest endeavor to solve the problems of regeneration of these children of the sea and forest, upon a reasonable basis of security to life and property, and of industrial development, this work, while already giving considerable assurance of success, is, according to Captain John P. Finley, 27th United States Infantry and governor of the District of Zamboanga, yet in its infancy. To this excellent military officer and efficient and conscientious governor, is due the credit of the Moro Exchange System, and expressed in his words very careful attention, conscientious study, and the exercise of much patience and perseverance will be required to accomplish the ideal set for the fulfillment of this project. To quote Governor Finley further:—

"The effort has already been a laborious one, but the progress made as shown from the effects of the benefits received by the people affords such a degree of satisfaction and encouragement as to justify the most earnest labors in furthering the enterprise by every possible means. In this connection it must be remembered that we are dealing with children in the accomplishment of the work in hand. Being thus inexperienced in the ways of the modern world—especially in those ways pertaining to the methods of legitimate business—the natives must receive constant assistance, and must often be encouraged to overcome minor difficulties which to them seem insurmountable. They manifest a tendency to exaggerate impending evils and introduce obstacles where none in fact exist, all of which is the natural result of an isolated life and the consequent lack of knowledge and experience.

CAPTAIN JOHN P. FINLEY, U. S. ARMY,

Governor of the District of Zamboanga and Founder of the Moro Exchange

"The Moro Exchange System then must be a school of instruction, a kindergarten in illustrating the methods of legitimate business, and also such a school as shall not only provide a practical education in the making of an honest and decent living, but at the same time furnish a means of subsistence for all those who participate therein and their dependants. The system must be coöperate and self-sustaining; it must instruct and nourish at the same time. The reward for labor must be immediate, adequate, and in the form of the legal currency authorized by the government. Education in the value and use of this currency as a medium of exchange, is indispensable. Daily contact with the Moros and other non-Christians under the varying conditions of their peculiar existence developed a strong desire to benefit them, mend their shortcomings, and enable them to draw a larger share of comfort and prosperity from the privileges of life.

"Clothed in ignorance and superstition they were easily led into the commission of brutal excesses, the enslavement of the poor and unfortunate, and the dissemination of virulent diseases that destroyed large numbers of people. Under such conditions not only must the children be educated but their parents and relatives must be controlled and guided aright in the strenuous race for existence. These are in general the circumstances that gave rise to the conception of the Moro Exchange System.

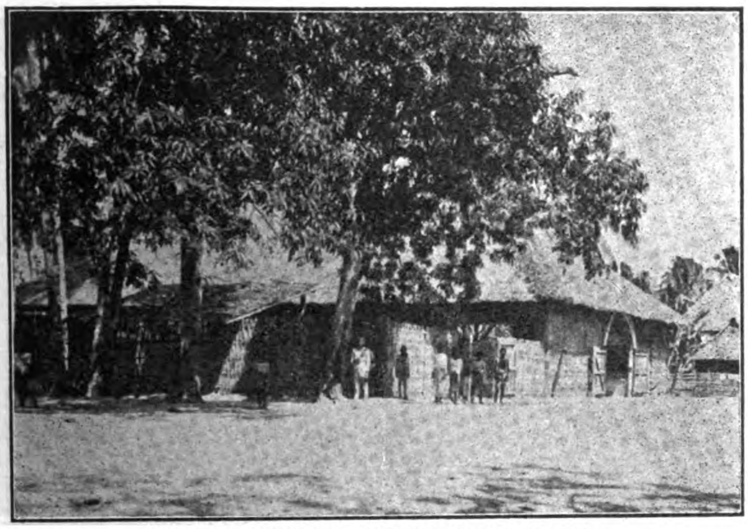
"The great majority were at the mercy of the small minority, the latter constituting the official class who held hereditary or accidental title, and in whose favor the rude customary laws of the tribes were constructed. Naturally the first impulse was to relieve the oppressed. Laws must be passed to prohibit slavery and the prohibition must be made effective by the rigid enforcement of laws. The taxes laid upon the people must be uniform and collected, and accounted for in accordance with law.

"The constant and indiscriminate use of firearms and other weapons must be discontinued. The warring of the different tribes must cease. Life must be respected and made secure by every safeguard. Next to life must be rights of property to be protected to the fullest extent. The rightful law founded on the consent of the governed is no respecter of persons."

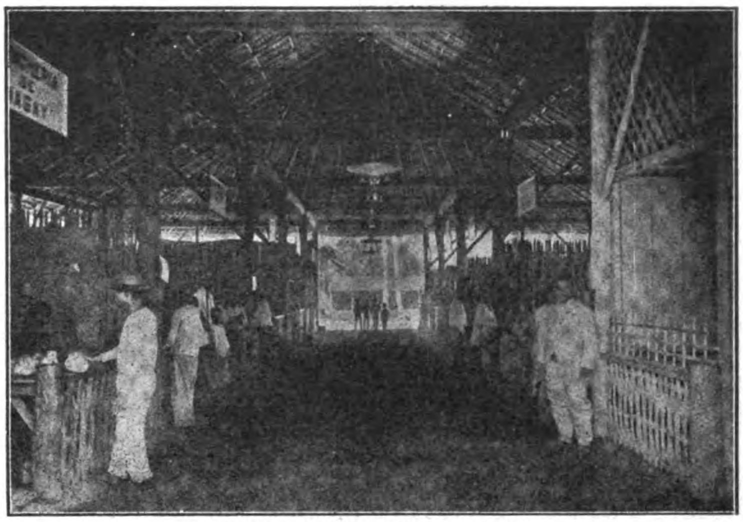
LEGISLATION ENACTED.—The necessary legislation was enacted and the people were patiently and considerately instructed. They were taken into the confidence of the government and this confidence was largely reciprocated. The new systems of law, however, seemed to them inexplicable, strange, and unnecessary, and better suited to some other class of people in a different portion of the earth. Then the government resorted to other methods to bring about an understanding. Public meetings were held at Zamboanga and at the leading *rancherias* in other parts of the district. At first the people did not wish to attend fearing it was a ruse on the part of the Americans to kill them. Never before had they been called together to discuss public questions in which all of the people participated. However, it was the order of the government and their religion taught them to obey without question their lawfully-appointed superiors. After a few meetings their fear and trembling gave way to a greater degree of confidence. They found that they could stand upon their feet in safety and that their lips could respond to the effort of the will to express their feelings, explain troubles and ask for relief, under the protection of the government. Finally they flocked to the meetings by thousands, and the government officials discussed every phase of the government's attitude towards them and its good faith in its promises to them. They, the people, were asked to contribute to the establishment of the system. An appropriation was added to these contributions of the Moros and other non-Christians.

WORK OF CONSTRUCTION.—The work of construction began without delay, being completed in time for the opening of the exchange at Zamboanga September 1st, 1904. The main structure is divided into 10 equal compartments for the principal *rancherias* of the District of Zamboanga, and is 60×100′ in dimensions. The compartments are arranged on either side of a 15′ passage way through the center of the building. Outside of the main building are the fish stalls, cattle sheds, tool house, wood and lumber yard, chicken pens, goat pens, latrines, dormitory, and water supply. The entire building and wood yard are surrounded by a high bamboo fence which is provided with gateways that can be locked. The dormitory provides shelter and bamboo beds for about 130 people and thus affords a much-needed accommodation for out-of-town traders and farmers, some of whom come a distance of 150 ms. with their produce. The well, the only one in Zamboanga, furnished abundant supply of excellent water. It is carefully piped and protected from contamination.

The methods of the exchange soon began to bring about a degree of tolerance among the traders of the different tribes and unite them on the common ground of industry and trade. The Mohammedans at first strenuously object to sitting in public meetings with or in conducting business at the same place with Subanos, Kalibugans, and Yacans of the pagan rites. These people are all of the same color and general appearance, and there should exist no insuperable obstacles, as between whites and blacks, to social quality and harmonious commercial and political relations. This feeling of antipathy is rapidly being overcome by the influence of the exchange system, for in this business associa



GENERAL VIEW OF ZAMBOANGA EXCHANGE



LOOKING THROUGH THE MARKET

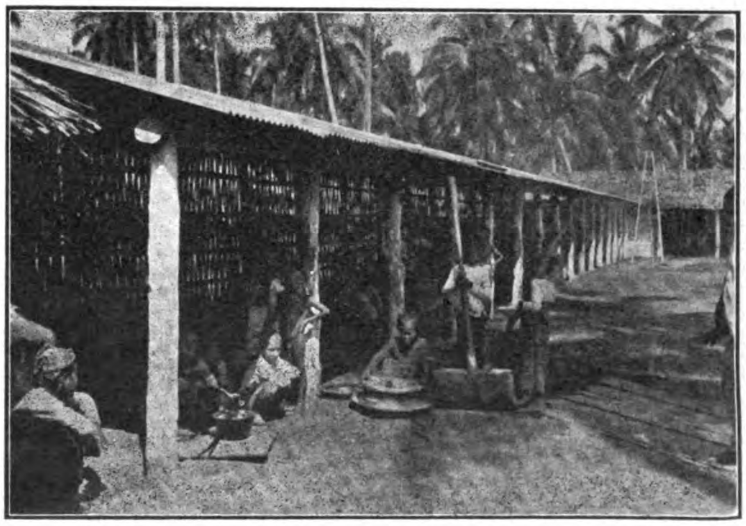
tion the natives realize, as never before, their dependence upon one another, entirely aside and apart from their religious scruples. The possibilities of legitimate trade began to appear and the savage member of the Moro Province finds that he has a place to occupy alongside of his Christian and pagan brothers, and that together they can work harmoniously, and accomplish an immense amount of good for themselves and the communities in which they live. It must not be understood, however, that all of the Moros and other non-Christians of the District of Zamboanga have yet come under the influence of this work which is still in its infancy. Its progress is necessarily slow owing to the difficulties of communication and the conservation of the Malay people, even where such conservation breeds poverty, disease, and all the ills that human kind are heir to. Moreover, the people are not yet convinced that American rule will continue in these Islands for they hear many rumors to the contrary, and thus naturally their suspicions are aroused and they hesitate to depart from the old customs. Then, too, the Moro Exchange System is opposed to the Datu System, or what is called in the northern provinces *caciquism* and in the United States bossism. The Datu System, with its unique form of graft, has always prevailed among the Moros and they have imposed it upon the weaker tribes in such a manner as to give rise to the most abject forms of slavery, poverty, and distress. This system had rendered industrial and commercial development impossible, and out of it had grown a vicious credit system with Chinese and European traders that paralyzed legitimate business. It is these internal conditions that the exchange system is seeking to overcome.

ONE OF THE TRADING STALLS

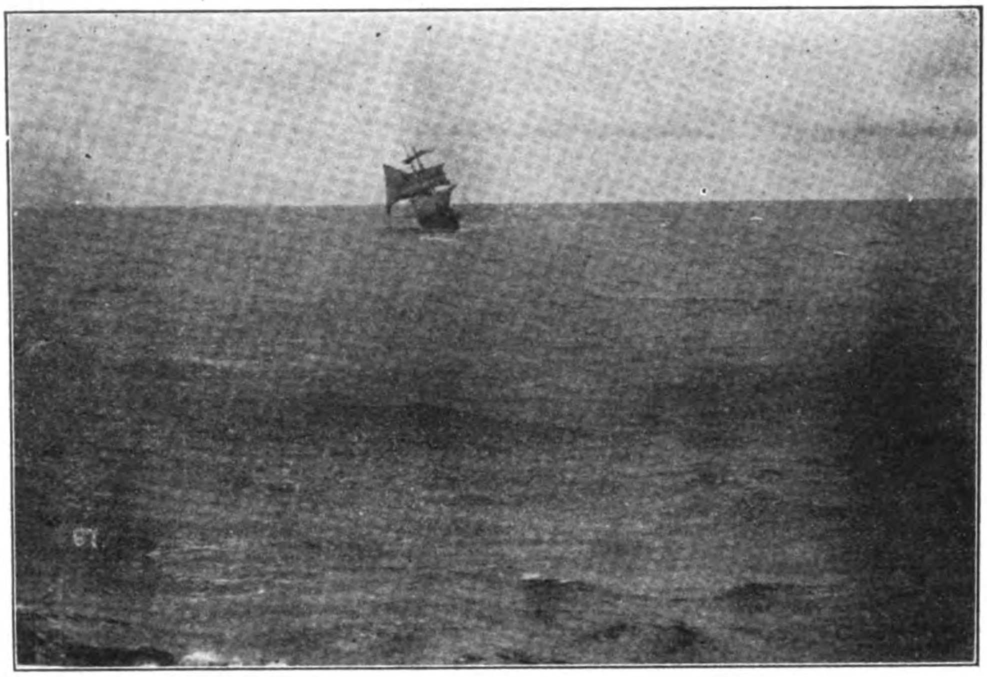
A GROUP OF MARKETERS

MORO EXCHANGE ORGANIZATION.—The Moro Exchange System is a part of the Tribal Ward Government of the District of Zamboanga, the political divisions of which are municipalities and tribal wards. The general relations of these two divisions to each other result in a triumvirate organization of tribal ward councils, tribal ward courts, and tribal ward exchanges,

WOODYARD OF THE EXCHANGE



KITCHEN WHERE FOOD IS COOKED *à la* KORAN



A "WINDJAMMER" OFF THE COAST OF MINDANAO

under the control of the governor of the District of Zamboanga, and is administered for the protection, instruction, and development of the Moros and other non-Christians of the district.

This combined organization is directed for the industrial development of the people under its charge. It is the firm belief of Governor Finley that the work of instruction and improvement should be conducted along lines of manual labor embracing the cultivation of the soil, raising of agricultural products, the gathering of forest products, the building of boats, the construction of roads and trails, the rearing of stock, the proper construction of houses, store houses, markets, bridges, carts, wagons, culverts, and landing places; the clearing of streams for the improvement of navigation, the observance of sanitary regulations, the improvement of the fishing industry, the cleaning of towns, the improvement of water supply for domestic purposes, and the marketing of crops, sea products and forest products. A vast field of productive and profitable labor is open to the 50,000 Moros and other non-Christians of the District of Zamboanga which will enable them, under proper supervision, to obtain a degree of prosperity never before realized nor even contemplated by them or by their former governors. These people must be used as important factors for the development of the country, not only as laborers but as producers. Under reasonable control they can become so thoroughly occupied with honest labor and the fruits thereof that they will not find time or opportunity to engage in conflicts among themselves or in revolt against the government.

The Moro Exchange System as a part of the scheme of government possesses the great advantage of furnishing a practical and attractive plan for the commercial education of these people, by affording them a knowledge of the value and uses of standard money, an opportunity to turn their labor and the products of their labor into such money, and thus to stimulate legitimate trade and prepare a foundation for the permanent prosperity of their country, and of themselves as useful members of the body politic. The project may have the appearance of a system of pure commercialism, but in reality its prosperity is found in organized communal thrift. Through its supervision by the government the people will find a way of living with safety, comfort, and pleasure. There will result a conquest of poverty and superstition The feudal tyranny of religion, and barbarous customary laws will become a thing of the past.

BRANCH EXCHANGES.—Since the establishment of the parent Moro Exchange at Zamboanga, branch exchanges have been opened at other points in the District of Zamboanga, notably at Taluçksangay, Margosa Tubig, Labangan, Lamitan, and Lubungan, broadly representing all sections of the district. Other branches will be established as soon as circumstances will permit. These branch exchanges will form trading posts for the collection of forest and sea products, and their disposition to merchants and commercial companies. The transactions will be for cash only, but the native will be given an opportunity to purchase for cash at the branch exchange store any article he may desire. Trading at the store is optional. Having received the standard money for his labor and products he may purchase his supplies where he chooses. The main object is to place the native in full possession of the fruits of his labor, in the form of money, and give him perfect freedom in doing what he will with it coupled with an opportunity to purchase his needs at the lowest market price. Government control will be applied only so far as the necessities of instruction and protection demand it for the betterment of these people.

In order to provide a fund for the maintenance of the Moro Exchange System, a tax of 1 per cent has been imposed on daily sales, which is collected by the superintendent and deposited with the Provincial Treasurer to the credit of the particular exchange making the deposit. This fund is used for the payment of salaries of superintendents and laborers, for the repairs to buildings, and for the purpose of equipment. The natives are required to pay this tax each day upon the completion of their business at the exchange. This was a matter of voluntarily agreement on their part after the purpose of the tax had been fully explained to them.

BUSINESS TRANSACTED.—The cash sales of the exchange at Zamboanga since September 1st, 1904, aggregate ₱221,905.79 Philippine currency. During the last 6 months the total amount of business has been more than double that of the preceding year. The cash sales at the branch exchange at the Moro Town of Talucksangay, about 15 ms. E. of Zamboanga, since May 1st, 1905, have aggregated ₱22,310 Philippine currency. The combined cash sales at the other branch exchanges which have just been opened aggregate ₱31,799.66 Philippine currency. The aggregate cash sales at all exchanges to February 28th, 1906, presents a total of ₱253,605.45 Philippine currency. The receipts from the taxes on daily sales at the various exchanges make them self-supporting and also provide a fund for improvements. At each branch exchange the buildings have been constructed by the natives under the supervision of headmen of tribal wards who have been instructed in the work. There has been a steady and continuous increase in the volume of business at all the exchanges and this will become more and more apparent as the area of cultivation grows larger, the opportunities for employment increase, and the system embraces more of the inhabitants of the interior.

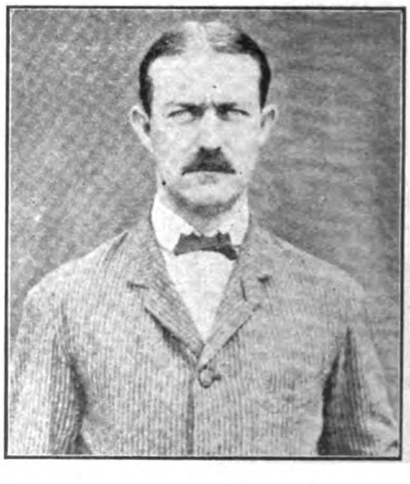
Practically all this money from the exchanges is expended by the natives in Zamboanga for the purchase of drygoods, notions, hardware, petroleum, cooking utensils, manufactured tobacco, and materials for boat sails and for fishing. The Moros and other non-Christians who now visit Zamboanga are better clothed and fed than ever before. The revenues from the exchanges have enabled them to clothe their families, send their children to school, and provide many additional comforts for the home. Poor men have had the opportunity to purchase boats and equip them for sea travel in bringing sea and forest products to the market. All of this has had a marked effect upon the imports and exports at Zamboanga, especially the former. The collector of customs reports an increase of revenue in 1905 over 1904 of about 80 per cent, the largest increase occurring in the classes of articles purchased by the natives.

NON-CHRISTIANS OF THE DISTRICT.—The following list of Moro and other non-Christian tribes of the District of Zamboanga will indicate to some extent the variety and character of people to be dealt with in promoting the present system of self-government and of industrial regeneration:—

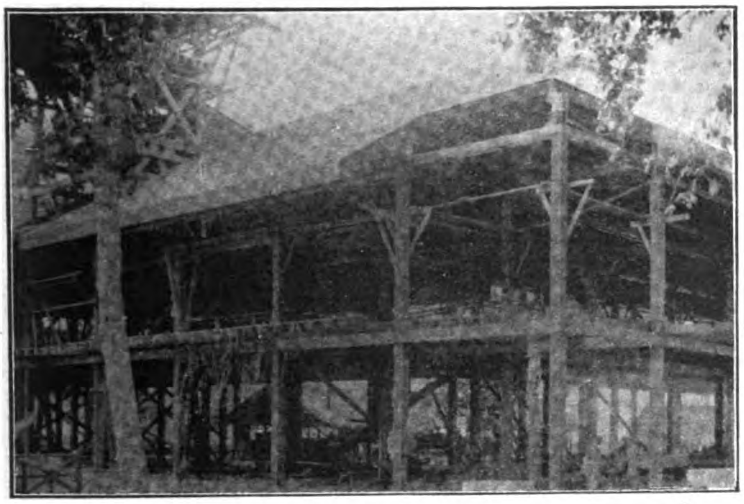
NAME OF TRIBE.	OCCUPATIONS.
Maguindanao	Slaveholders, boatmakers, and fishermen.
Joloano	Traders, pirates, and slaveholders.
Tiruray	Farmers and stockraisers.
Yucan	Farmers, stockraisers, and fishermen.
Samal Laut	Fishermen, pirates, slaveholders, and cloth weavers.
Samal Bitali	Farmers and fishermen.
Samal Lutangan	Fishermen, grassweavers, and clayworkers.
Kalibungan	Farmers and hunters.
Samal Butuan	Farmers, grassweavers, and woodworkers.
Ilano	Traders and fishermen.
Subano	Farmers, stockraisers, and cloth-weavers.
Malayo	Fishermen, pirates, and slaveholders.
Maranao	Fishermen and hunters.
Masibay	Pirates and hunters.

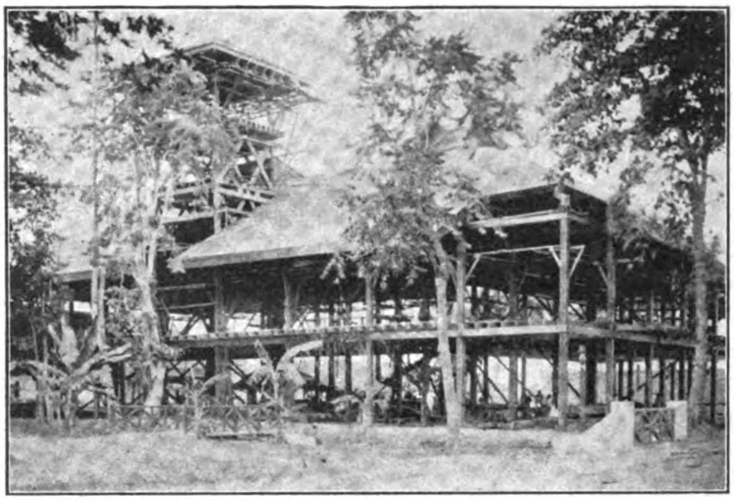
NEW PROVINCIAL CAPITOL

The new provincial capitol at Zamboanga is progressing rapidly and satisfactorily. This building will represent the first of several



MR. C. F. VANCE, C. E.,
Assistant Engineer of the Moro Province





TWO VIEWS OF THE PROGRESS OF CONSTRUCTION OF NEW PROVINCIAL BUILDING

permanent improvements projected by the Legislative Council of the Moro Province, and will be a monument to the present government. The council's treatment of the whole scheme has been most liberal, and earnest effort is being given to not only make a handsome and commodious home for the government but to make the structure a standard of strength and durability as well. It is being constructed entirely of concrete and native hard woods, and the workmanship is of the best throughout. The building was framed completely on the ground. Erection of the frame was begun on January 5th, 1906. In this connection great credit is due Mr. C. F. Vance, assistant provincial engineer, and Mr George Green, the superintendent in direct charge of construction, for the difficult and skillful manner in which the difficult task of laying out the work was performed. Mr. Vance, who is an engineer of great ability, has rendered to the Moro Province most satisfactory service in superintending the field duties of the engineer's office, and he pays a high tribute to the skill of Mr. Green in handling the provincial building construction. His workmanship was seen at once when the erection began. The frame went up as rapidly and fit as perfectly as though structural steel was being used instead of green native woods. In the beginning the work seemed slow. The logs had first to be cut in the forests from 20 to 60 ms. away, and then transported by lankans to Zamboanga, where they were worked up by hand. The girders, floor joists, truss timbers, purlins, etc., were furnished from the sawmill of Messrs. Beebe & Lyons, at Isabela, Island of Basilan. All posts are of ipil. Brackets supporting the balconies are molave, batu, and ipil. The ground floor will be of tile; the second floor of polished molave; the partitions, wainscoating, etc., are of different hard woods, arranged to display their beauty by contrast. All timber in the roof trusses, girders, etc., are given a thorough coating of boiled hot coal tar. The roof is pressed metallic Spanish tile laid on tight sheeting and oiled paper and was furnished by the Metallic Roofing Company of Toronto, Canada. The ceilings are pressed steel furnished, through Mr. F. W. Home of Yokohama, by the same company. Water will be distributed throughout the building from a tank located in the tower and supplied by a 6″ Rider-Ericson hot air pumping engine. The building will be wired for electric lights, and modern closets and lavatories will be installed. The treasurer's vault is of steel and concrete of the latest burglar and fireproof construction. In short, the building, when completed, will be one of the handsomest and most complete structures of the kind erected in the Philippines since American occupation.

NOTES ON WAGON ROADS, RAILWAYS AND WATER POWER IN MINDANAO

(By Captain J. P. Jervey, Corps of Engineers, U. S. Army, Provincial Engineer)

The most potent factor in the development of a new country must always be good means of communication and transportation. Contact with other people gives the primitive inhabitants new channels for mental development, while good transportation gives free development to commerce with its civilizing influences.

At present in Mindanao there are no wagon roads leading from the coast to the interior, excepting from Camp Overton on the N. coast and Malabang on the S. coast to Lake Lanao. The former of these is being rebuilt from Iligan *via* Overton to Lake Lanao. Most of it will be a substantial Telford road, and will be possible at all seasons of the year. The Malabang-Lake Lanao Road runs through a region, the soil of which is composed of coarse black volcanic sand, and remains in good condition at all seasons if washouts after heavy rains are promptly repaired.

The grades on both these roads, especially the Malabang Road, are very heavy, and render freighting by wagon extremely expensive. The average load for a six mule team probably does not at present exceed 2,000 lbs. on either road. The other roads of the Moro Province, excepting in the vicinity of Zamboanga, where some excellent highways have been built, are mere trails.

The traffic over the Overton-Lake Lanao Road, on account of the large garrison and great amount of construction work at Camp Keithley, on Lake Lanao, is very heavy, and has involved an enormous annual expenditure on the part of the War Department. For this reason surveys have been ordered at various times by the military authorities for railroads, both steam and electric, connecting Camp Overton and Camp Keithley. This railroad would be about 21 ms. long, and a steam road of 3′ gauge with a maximum grade of 4 per cent could be built, not including contractors' profit, for $350,000 to $400,000, U. S currency. This road could easily handle in one day with a single locomotive what the present wagon trains handle in ten days.

Railway as a Commercial Venture.—As a commercial venture, it is believed that the road would soon be a paying investment. It would handle all government supplies for the various lake posts, and the native products, which are now brought down by pack ponies or cargadores. The country is well timbered, the rainfall abundant, and the valley of the Agus River, through which the road runs, is wonderfully fertile, tobacco, hemp, rice, and coffee, all growing luxuriously with most indifferent cultivation. In addition, if the paper-making experiments with Cogon grass succeed, a ready-made industry of unlimited possibilities is awaiting the building of the road. The construction of good hotels or rest houses at Iligan and Camp Keithley might be considered in connection with the construction of the road, and it is certain that the wonderful climate of the lake region and the beautiful Agus Falls would soon attract health seekers and tourists in large numbers.

If the road is built by private capital, the N terminus should be Quinalang Cove, 4 ms. E. of the town of Iligan, which is an excellent harbor, well sheltered and of ample depth. This extension would open up the great plain bordering Iligan Bay, which is admirably located and adapted for cocoanut cultivation. In time the road might be extended, as shown by broken lines on an accompanying map, around Lake Lanao and S. to Parang, which also has an admirable harbor.

Steam vs. Electricity.—The question of steam or electric power for the road must be carefully considered. If it is built by the War Department, steam should be used on account of lower first cost and simplicity. If a commercial concern takes hold of the work with capital both to build the road and develop the country, electricity will undoubtedly be the most economical, and the following facts as to water power are to be noted. The Agus River rises in Lake Lanao 2,300′ above the sea level, and after a torrential course of 21 ms. empties into Iligan Bay. At 2 ms. from the mouth of the river, there is a vertical drop of 220′. The flow of the river at the time it was gauged was 5,800 cu. ft., per second, and from enquiries among the inhabitants, and consideration of the steadying effect caused by the storage capacity of the lake, it is believed that the minimum flow would not be less than 2,000 cu. ft., per second. This would give 5,000 theoretical h. p. Assuming the efficiency of the hydraulic apparatus at 70 per cent and that of the electric generator at 95 per cent, 32,250 electric h. p. would be delivered to the line even in the most prolonged dry season.

At many other points in the river, the fall is either vertical or very rapid, and a large amount of power could be developed by the construction of a comparatively short length of lateral canal or flume. At present at least 500,000 theoretical h. p., even during extreme low water, are being wasted between Lake Lanao and Iligan Bay.

By using high voltage and small wires, this power can be efficiently and economically transmitted to points within a radius of 100 ms., and would be of inestimable value in future development.

In addition to the Agus River, there are many other streams in the island, particularly in the Davao region, where water power could be easily developed.

LAND LAWS AND TITLES IN THE MORO PROVINCE EXPLAINED

With the exception of the Public Land Act, which has only a limited application to the Moro Province, the laws governing land titles in this province are those general laws on the subject which are in force throughout the Philippine Islands. As the chief interest in the province, however, lies in its agricultural possibilities, and as prospective settlers are not usually acquainted with the laws of the Philippine Islands, a brief explanation of the law governing the acquisition and holding of real estate may prove of interest.

There are four classes of titles to land in the Philippine Islands which offer to those holding under them varying degrees of security, namely: (1) Grants from, or titles derived from the Spanish Government; (2) titles registered under the Spanish system of registration; (3) titles registered under the new, or *Torrens*, system of registration; (4) grants or leases of land from the present government under the Public Land Act.

SPANISH GRANTS.—Under this heading are included, for purposes of classification (*a*) grants from the Spanish crown, or land grants proper, (*b*) sales of public lands by the Spanish Government, (*c*) confirmation of *squatters' rights* by *adjustment* proceedings, and (*d*) confirmation of *squatters' rights* by *possessory information* proceedings during 1894 and for a short period thereafter, under a royal decree dated February 13th, 1894. Some of these classes of titles are met with frequently and all of them are found occasionally in the northern provinces of the Philippine Islands; but the writer, who has had occasion to examine a considerable number of titles from different parts of the Moro Province, has yet to find a title of any of these classes, and believes that there are none in existence in the province. This is doubtless due to the fact that at the time these titles were granted in other parts of the Islands, Mindanao was, as it is now, practically uninhabited, and was attracting few settlers.

As these classes of titles are of no importance in this province, it is useless to discuss their natures and values. They are mentioned because many land holders are disposed to regard any document written in the Spanish language and relating to real estate as a genuine *Spanish grant*, and believe themselves to be holding under that title. The prospective land buyer in this province is therefore warned not to place too much confidence in documents alleged to be *Spanish grants*. Such documents may be excellent title papers of another kind but the chances are decidedly against their being what they are offered for.

SPANISH SYSTEM OF LAND REGISTRATION.—One who desires to purchase lands from private owners in the Moro Province will frequently be confronted with title papers which have been registered under the Spanish system of registration, or by unregistered documents which he is told are subject to registry under that system.

The Spanish system of registration of documents affecting interests in land is contained in *La Ley Hipotecaria* (The Mortgage Law), which has been in effect in the Philippines since 1889. While this system has been modified in some particulars by American legislation, it still exists side by side with the new, or Torrens, system of land registration, so that there are in the Philippine Islands two distinct systems of registration, both differing materially from the system of recording common to most of the states of the Union.

Americans in the Philippines usually have a distorted idea of the Spanish registration system and its effects. They take it for granted that it is similar to the system of recording with which they were familiar in the United States. It is important to bear in mind that the Spanish system differs from the American system both as to the kinds of documents which are subject to record and as to the effects of recording or registering. The primary object of recording a document affecting real estate in the United States is to give notice to the world of the transaction. It is true that the record of transfers of a piece of property enables a prospective buyer to trace it back to its source and determine the validity of the title, but the fact that a deed is recorded does not in itself show or even indicate that the title of the person executing the deed is valid. Under the Spanish system, on the contrary, the fact that a deed to a piece of land has passed the scrutiny of the registrar and has been admitted to registration, of itself indicates, though not conclusively that the title of the person executing the deed is perfect, as otherwise it would not have been accepted for registry. The Spanish law therefore permits only certain kinds of documents relating to real estate to be registered originally,—documents which in themselves indicate title, such as government grants or judicial decrees. After original registration is effected ordinary public documents properly drawn and affecting the property originally registered are subject to registry.

The prospective purchaser of real estate which he believes to be subject to registry under this system should always discover whether or not the tract of land in question has before been registered in the registry of property. If it has and appears in the registry in the name of the person who sells he will be able to register the deed by which it is transferred to him. If it has not it will probably be impossible for him to secure registry, as the titles required for original registry are no longer obtainable.

There were of course very few titles in the Philippine Islands subject to original registry under the restrictions of the Spanish system, land holding being based on mere possession rather than on paper titles, so the law provided a proceeding called a *possessory information*, whereby a person who possessed land under certain conditions but who lacked a paper title might apply to a court and get a judicial decree which would be subject to registry, and which after a period of twenty years would ripen into a title. By far the greatest number of land holdings in the Philippine Islands which are based on paper titles are based on these possessory information proceedings. They are not in every case satisfactory. They do not afford much security as many of them are improperly or fraudulently executed, and none of them have as yet been in existence long enough to have ripened into a title. They serve, however, as a basis for securing a perfect title under the new, or Torrens, system of registration.

TORRENS SYSTEM OF LAND REGISTRATION.—By act No. 496, enacted in November, 1902, the Philippine Commission introduced into the Philippine Islands the Torrens system of land registration. Under this system, as the reader is aware, application is made to a special court which passes on the title of the applicant. If the court finds that the applicant has title, it so decrees, and this decree which is in effect a declaration of title guaranteed by the government, is registered in the registry of property of the property where the land is situated. The owner's title is perfect and not subject to controversy.

The advantages of such a system are apparent, and settlers who have acquired land by purchase should not neglect to have their titles perfected, if possible, by a proceeding in the Court of Land Registration

The principal difficulties in the way of registering lands in the Moro Province under this system in the past, have been Act No. 1224 of the Philippine Commission and the failure to extend the Public Land Act or any part of it to the Moro Province. Act No. 1224 prohibited the Court of Land Registration from taking cognizance of applications for registration of lands situated in the Moro Province (outside of the District of Zamboanga)

Photo by Aeronaut Gibbs. SPANISH FOUNTAIN AT JOLO

Photo by Aeronaut Gibbs. PASEO DE AROLAS, JOLO

unless the applicant's title was based upon a royal grant from Spain. Since, as stated above, there are no such grants in the Moro Province, this made the Torrens act a dead letter except in the District of Zamboanga. Fortunately Act No. 1224 has been repealed in its application to the Moro Province by Act No. 1428, of the Philippine Commission, enacted December 28, 1905.

One trammel still remains to the operation of the Torrens system in the Moro Province outside of certain sections. Perhaps 99 per cent of titles to property in the Moro Province are based upon possession alone and are not supported by paper titles. Since the applicant for registration must, in order to secure a decree, prove that he has title to the land, it is evident that very few holders of property in the province would be able to present the necessary proofs of title, unless some special concession were made in their behalf. To remedy this condition, which is general throughout the Philippine Islands, the Public Land Act provides, in *Chapter VI*, that persons who by themselves or their predecessors in interest have been in the open, continuous, exclusive, and notorious possession and occupation of agricultural public lands, under a bona fide claim of ownership except as against the government for a period of 10 yrs. prior to the taking effect of the public land act, shall be granted a title to the land which they hold upon application to the Court of Land Registration. In other words the Public Land Act provides for the granting of a Torrens title to *squatters* who have complied with certain conditions. This is the most liberal and far-reaching provision which has as yet been inserted in the legislation relating to public lands in the Philippine Islands, and, where it is in force, will tend to place land titles upon a secure basis at once. Unfortunately it is applicable only to those sections of the Philippine Islands to which *Chapter VI* of the Public Land Act has been extended As will be seen further on, *Chapter VI* of the Public Land Act has been extended only to the following sections of the Moro Province: The District of Zamboanga, that portion of the District of Lanao not included in the basin of Lake Lanao, and in certain parts of the District of Davao. Outside of these favored districts the holder of land who has no other title than his possession or the possession of those from whom he has bought stands little chance of getting his holdings registered under the Torrens system. On the contrary he must be prepared to face the contingency, however remote, that the government will dispossess him of his lands by ejectment. It would be an inestimable boon to the province if the Philippine Commission would extend *Chapter VI* of the Public Land Act to the entire Moro Province.

GRANTS OR LEASES OF LANDS UNDER THE PUBLIC LAND ACT.—The Public Land Act (Act No. 926 of the Philippine Commission), as every reader who is interested in Philippine lands knows, provides for disposing of the public domain to individuals in four ways: (1) By homestead; (2) by sale; (3) by lease; (4) by free patents to certain native settlers.

A homestead consists of but 16 hectareas and is granted only to persons not already owning more than 16 hectareas of land. No individual can purchase from the government more than 16 hectareas of land. A person may, provided he owns less than 16 hectareas of land, secure a homestead of 16 hectareas and purchase 16 hectareas more, or 32 hectareas in all. A corporation may purchase 1,024 hectareas of land, and either a corporation or an individual may lease 1,024 hectareas of land. Leases may run for 25 yrs. and be renewed for a second period of 25 yrs. The rental must not be less than 50 centavos nor more than ₱1.50 per hectarea.

The Public Land Act went into effect on July 26th, 1904, except in certain sections of the Philippine Islands, one of which was the entire Moro Province. *Section* 78 of the act provided that it should not be effective in such excluded parts of the Islands until extended thereto by resolution of the Philippine Commission. Until very recently no part of the Public Land Act was extended to the Moro Province. On December 22nd, 1905, the Philippine Commission by resolution extended the act in its entirety to certain parts of the Moro Province and gave it a limited extension to the rest of the province. The situation as it is at present in the different sections of the province may best be learned by reference to the resolution of the commission, which is herewith given in its entirety:—

RESOLUTION OF THE PHILIPPINE COMMISSION. —*Resolved*, That in accordance with the provisions of section seventy-eight of Act No. 926, ordinarily known as the Public Land Act:

(1) Said Public Land Act in its entirety be extended over and put in force throughout the district of Zamboanga, in that portion of the District of Lanao not included in the basin of Lake Lanao, and in that portion of the District of Davao included in the municipalities of Mati, Baganga, Caraga and Cateel;

(2) That *Chapter III* of said act, relating to leases of portions of the public domain, be extended over and put in force throughout the entire District of Cotabato, with the exception of Cotabato Island, on which the town of Cotabato is located, the Island of Tamontaka, the area included within a circle whose radius is 3 ms. and whose center is the central point in the masonry fort at Reina Regente, and the area within a circle whose radius is 3 ms. and whose center is the central point in the masonry fort at Pikit;

(3) That *Chapter I* of said act, relating to homesteads on the public domain, be extended over and put in force in Cotabato Island, on which the Town of Cotabato is situated, the Island of Tamontaka, the area included within a circle whose radius is 3 ms. and whose center is the central point in the masonry fort at Reina Regente, and the area within a circle whose radius is 3 ms. and whose center is the central point in the masonry fort at Pikit;

(4) That *Chapter III* of said act, relating to leases of portions of the public domain, be extended over and put in force in that portion of the District of Davao not included in the municipalities of Mati, Baganga, Caraga and Cateel, with the exception of the territory embraced within a circle having a radius of 5 ms. and whose center is the central point in the district jail at Davao;

(5) That *Chapter I* of said act, relating to homesteads on the public domain, be extended over and put in force in the municipalities of Mati, Baganga, Caraga and Cateel, and the territory embraced within a circle having a radius of 5 ms. and whose center is the central point in the district jail at Davao;

(6) That *Chapter III* of said act, relating to leases of portions of the public domain, be extended over and put in force in the Island of Tawi Tawi, in the district of Sulu;

(7) That *Chapter I* of said act, relating to homesteads on the public domain be extended over and put in force in the following areas of the district of Sulu:——

The land within a circle whose radius is 1½ ms. from the center of the central point of the main landward gateway in the walls of the City of Jolo, the land within a circle whose radius is 1½ ms. and whose center is the central point in the masonry fort in the town of Siassi, and all other portions of the district of Sulu for the time being exempted from the provisions of the land Act.

(8) That *Chapter IV* of said act, relating to free patents to native settlers, in its entirety be extended over and put in force throughout the whole of the Moro Province;

And, That the legislative council of the Moro Province is directed to make known throughout the province the foregoing resolution and particularly the limitations imposed by the Public Land Act as to the time within which native settlers may obtain free patents by virtue of *Chapter IV* of the Public Land Act.

District of Zamboanga

In which is Located the City of Zamboanga, Capital of the Moro Province, and which Offers Splendid Opportunities to Agriculturists as well as Commercial Enterprise and Industrial Undertakings

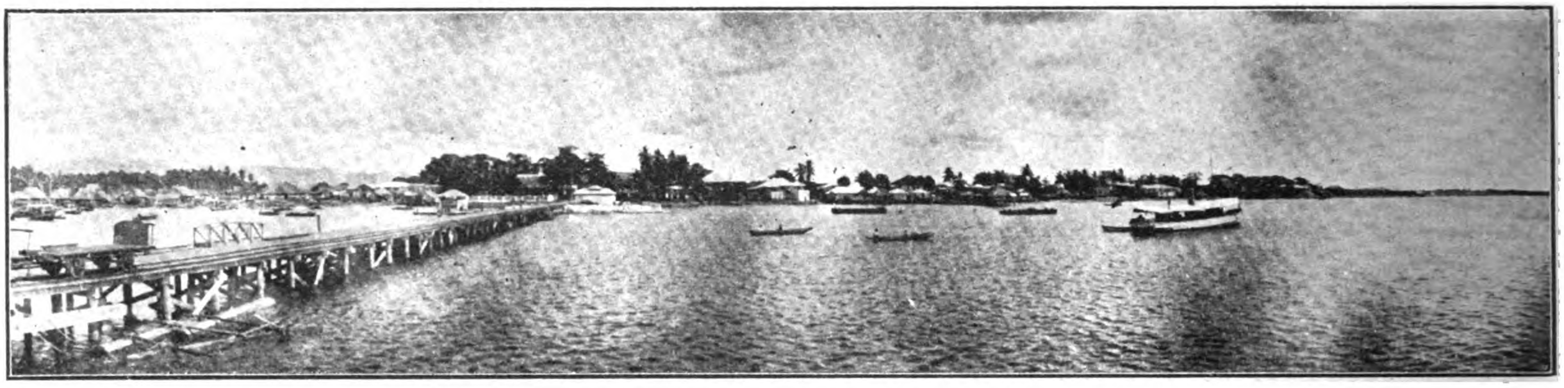


Photo by Encinas, Zamboanga. CITY OF ZAMBOANGA, LOOKING NORTH FROM THE PIER

The northern and western portions of the District of Zamboanga present splendid opportunities to the agriculturalist, and to those desiring to go into the timber business. From San Ramon farm north the coast is indented with bays into which open valleys with fine streams of running water, and large amounts of excellent land, a very little of which is taken up. This land is especially excellent for cocoanuts and hemp. The presence of Moros along this coast accounts very largely for the lack of development up to date, but now that they are thoroughly under control it is believed that the development of this section will proceed rapidly.

The country back of the old settlement of Dipolog and Dapitan is also splendid agricultural country, well-watered and well-timbered, and the inhabitants are, without exception, most friendly. The streams furnish communication a considerable distance inland.

There is a large amount of public land throughout this section, from the northern boundary of the province just north of Dapitan all along the coast as far south as the San Ramon Farm.

Lying south of Zamboanga is the large island of Basilan, which is capable of supporting a population of 75,000 people. It is extremely rich in valuable timber, and grows excellent hemp.

The people of this island have given no trouble, settlers among them have been uniformly well treated. The natives were kept under control by the late Datu Pedro Cuevas, and since his death the affairs of the island have been most efficiently managed by Mr. J. M. Browne, who has gained the confidence of these people, lives and moves among them without any protection.

Captain John R. Procter, Secretary of the District of Zamboanga, has also done a considerable amount of work among these people, as well as being a very active factor in the management of the affairs of the district of Zamboanga, including the building up of the Moro Exchanges.

ZAMBOANGA GATEWAY TO ORIENTAL TRADE

(By S. E. DeRackin)

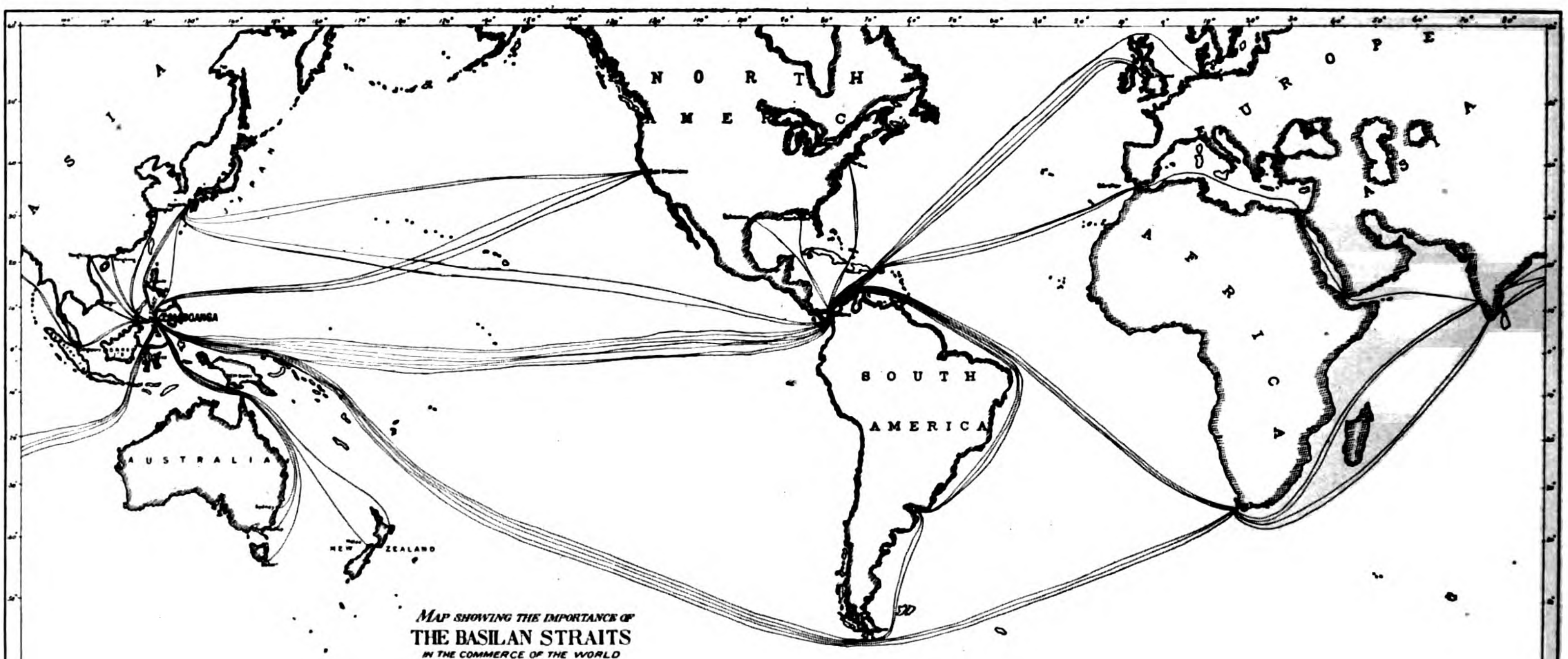
The position of the Philippines as a whole, with reference to the trade of the Far East, is an ideal one, even today; but with the completion of the isthmian canal their value to the United States will be beyond compare.

Our control of the Philippines, and the recent Titan struggle in Korea and Manchuria are but incidents in a movement which has as its ultimate object the control of the Pacific. William H. Seward knew whereof he spoke when he declared that "henceforward European commerce, European politics, European thought, European activity, however effectively they may increase in intrinsic importance, and European alliances, however intimate they may become, will sink in relative importance—meanwhile the Pacific Ocean, its shores, its isles, and the vast region beyond, will become the principal theater of events in the great future of the world." The prophetic ken of Thomas H. Benton enabled him to see the day when the rule and empire of the world would belong to the route to the Indies, and to the nation which controls the commerce of that route.

The isthmian canal, the Hawaiian, Aleutian, Ladrone, and Philippine Islands place the people of the United States in absolute control of the Pacific, and they can no more escape the responsibility of their position than they can cease to be a progressive people.

So much for the Philippine Islands as a whole.

THE MORO PROVINCE.—There are more promising opportunities for young men of moderate means in this province than in any other section of the Islands. The reason for this is due to the fact that the Moro Province is without



AMERICAN COLONY AT ZAMBOANGA ENJOYING ITS ANNUAL PICNIC

other population than that encountered by the white man in blazing his way across the plains and through the forests of our western country. This province has some 25,000,000 acres of virgin forest and agricultural lands which are as free as the air. The best hemp produced in the Islands is grown here; our hard woods are the best; our cocoa cannot be equaled on earth; para rubber and gutta percha grows wild throughout our immense forests—in fact the soil of this province is so rich and deep that a crop of tobacco and sugar can be grown yearly without any fertilization whatever.

THE CITY OF ZAMBOANGA.—A glance at the accompanying map will give the reader some idea of the importance of Zamboanga, the capital of the Moro Province, as a future trade center. Situated as it is, midway of the Straits of Basilan, in the direct route of travel, even now, of all commerce between Australia and Asia and South America and Asia, and the potential trade of Europe and North America and Asia upon the completion of the Panama Canal, it stands to-day without a rival as the coming center of trade of the Far East.

AMERICAN BAZAAR, ZAMBOANGA

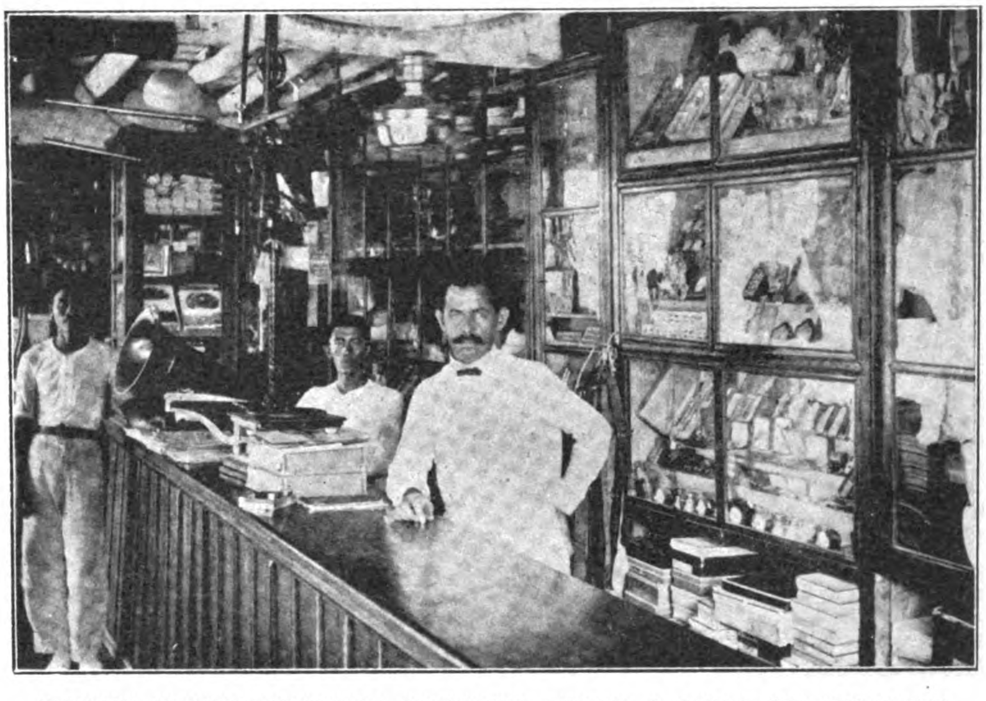
The growth of the business of the American Bazaar at Zamboanga, under the direction of Mr. A. Broad, is a striking example of the returns of small capital and sterling business ability in this new country. Starting in a small way about 4 yrs. ago, Mr. Broad opened the first American retail store in the district. By fair treatment of his patrons and retailing goods at a reasonable profit, he has built up a business that is second to none in the province.

The American Bazaar is located on the Escolta, in the central part of the city. It is a bazaar in every sense of the word. The lines of goods carried are for the most part American and from the American art houses. Recently Mr. Broad purchased the tailoring business and stock of gentlemen's furnishing goods formerly owned by Mr. Kauffman. His present store must be enlarged to accommodate the increasing business.

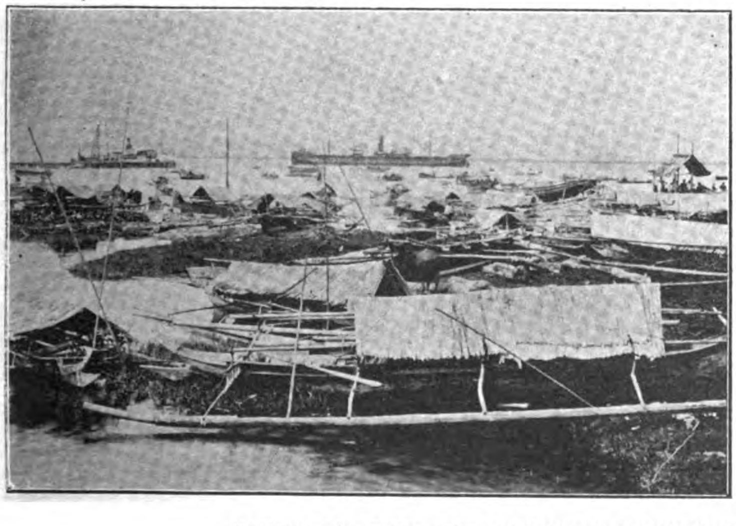
Mr. Broad's experience in the Philippines is one that might have dampened the ardor of a less fearless business man. When he arrived in Manila from Australia in June, 1899, the insurrection was in full blast. Nothing daunted, he got together a stock of goods and went into business in the Laguna country. While there he was captured by the insurgents, relieved of a considerable sum of money, tied to a tree, and left to his fate. He managed to get loose, however, and made his way to Biñan where he reported his treatment to the military

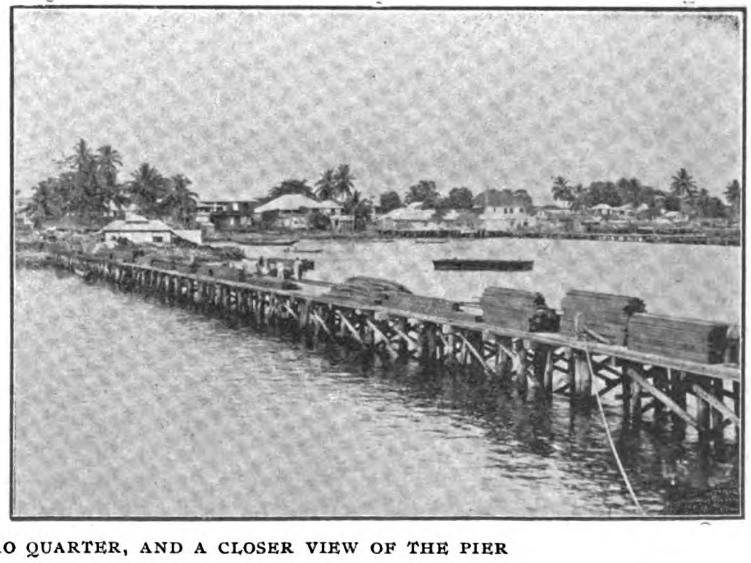
In March, 1902, Mr. Broad concluded to try his fortune in Zamboanga, and opened a store on the present site of Messrs. Darby & Co's. place of business. While there his store was ransacked by thieves, who secured considerable booty, but who were subsequently captured and sent to Bilibid.

Mr. Broad is one of the most enterprising residents and business men of the Moro Province. His motto is "Quick sales and small profits." He will succeed.



INTERIOR OF AMERICAN BAZAAR, ZAMBOANGA, AND MR. A. BROAD, THE PROPRIETOR





ZAMBOANGA PIER AND ANCHORAGE FROM THE MORO QUARTER, AND A CLOSER VIEW OF THE PIER

IMPROVEMENT AND EXTENSION OF THE CITY OF ZAMBOANGA

Plans for the improvement and extension of the City of Zamboanga, prepared by Mr. W. E. Parsons, consulting architect to the Philippine Commission, have recently been adopted by the Legislative Council of the Moro Province, and all future public works of the municipality will be conducted to conform therewith.

Zamboanga, established as a military post by the Spanish in the XVIIth Century, was maintained by them for this purpose until the American occupation in 1901. Commercially it was until recently of no more than local importance.

Attractively Situated.—As a military post the town was attractively situated and well arranged. The parade grounds, barracks, officers' quarters, in fact the entire town, had the advantage of facing the sea, with no obstructions to view or air.

With the prospect of a rapid growth in size and importance, it became evident to the government that the area suitable for commercial purposes and for residences would be insufficient in the near future. The situation of the town is peculiar in this respect. It is shut off from natural expansion on three sides —by the sea on the S., and by marshes and low land on the E. and S. On the W. alone is there opportunity of natural expansion. These conditions, together with the location of existing buildings of a permanent character form the basis of the adopted scheme for future development.

Purpose of the Plan.—The purpose of the plan is to provide (1) provincial and other public buildings, (2) an area for wholesale and retail business, (3) a desirable section for residences, (4) a convenient system for streets, and (5) public parks for recreation and amusement.

The location of the new provincial building determines definitely the civic center. This becomes the heart of the city, from which the principal arteries of communication radiate. For this purpose the irregular space N. of the provincial building adjoining the church is given a definite semi-circular form.

The building for the provincial government will be extended as future needs may require, towards the sea, with the principal facade on the waterfront. Such an extension will a little more than double its present capacity.

Placed symmetrically with this building on the opposite side of Calle Voluntarios, which is 100′ wide at this point, will be the custom house. This may be built in sections as required to provide for increasing business. The ground floor will be used for storage and the general handling of merchandise; the second floor will contain offices; the space in the court and that extending towards the river may be used for 1-story bodegas.

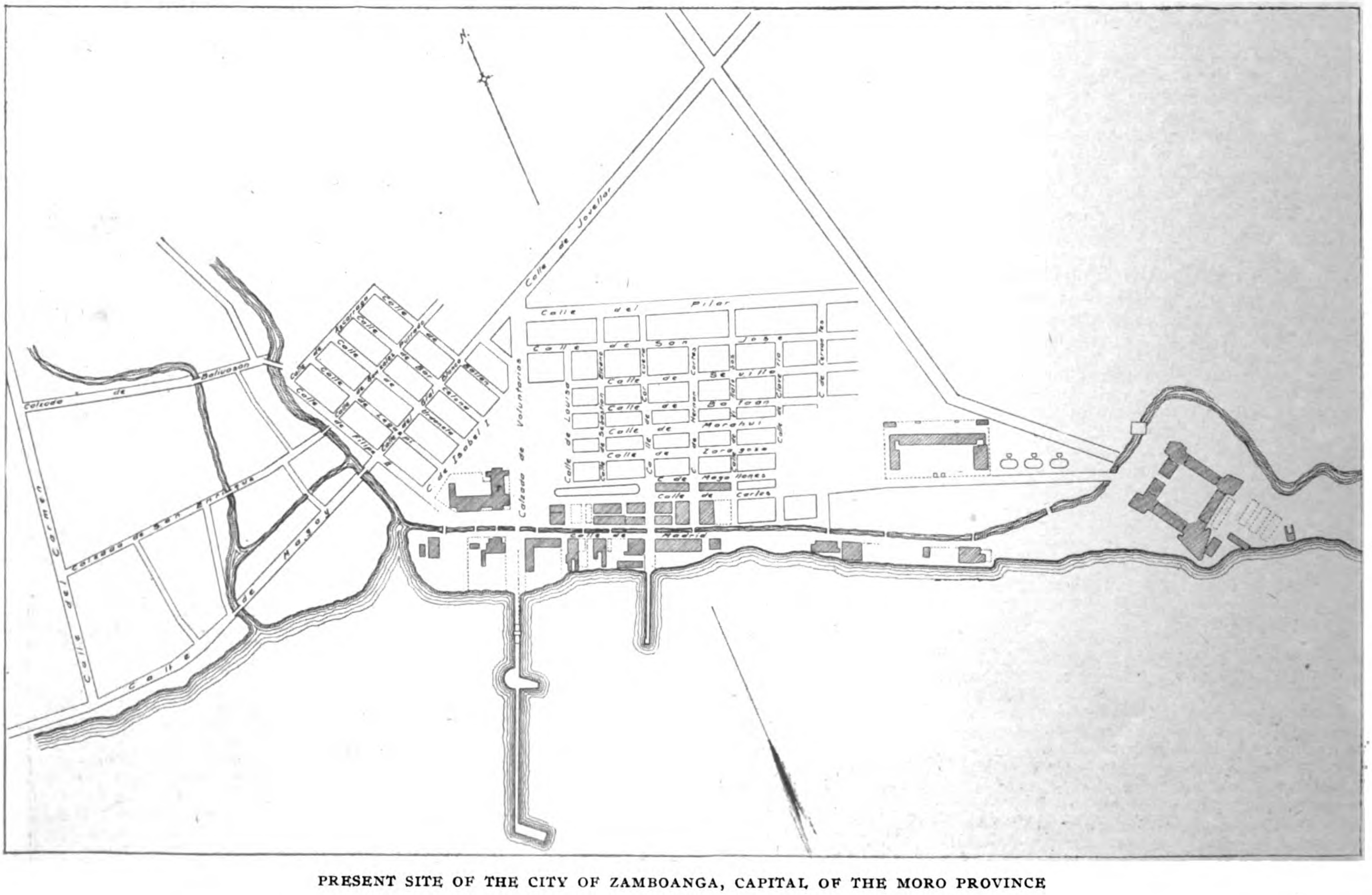
The public schools are located on the site bounded by Calle de Carmen, Calle San Enrique, Calzada de Guzu, and a new street. This site, admirably suited to its purpose on account of its central location and sanitary condition, has already been acquired. The school buildings are arranged in the form of a quadrilateral, being on or parallel to the street lines, and leaving a large court in the center to be used as a play ground. Part of the grounds is well shaded.

Business Section.—In a modern city of commercial importance, the business section should, according to expert builders, be compact, in order that merchandise may be handled at a minimum cost and loss of time. In the case of a seaport it should adjoin the docks and be conveniently near the custom house. Moreover, in a growing town there must be room for the expansion, both of the building area and of the docks.

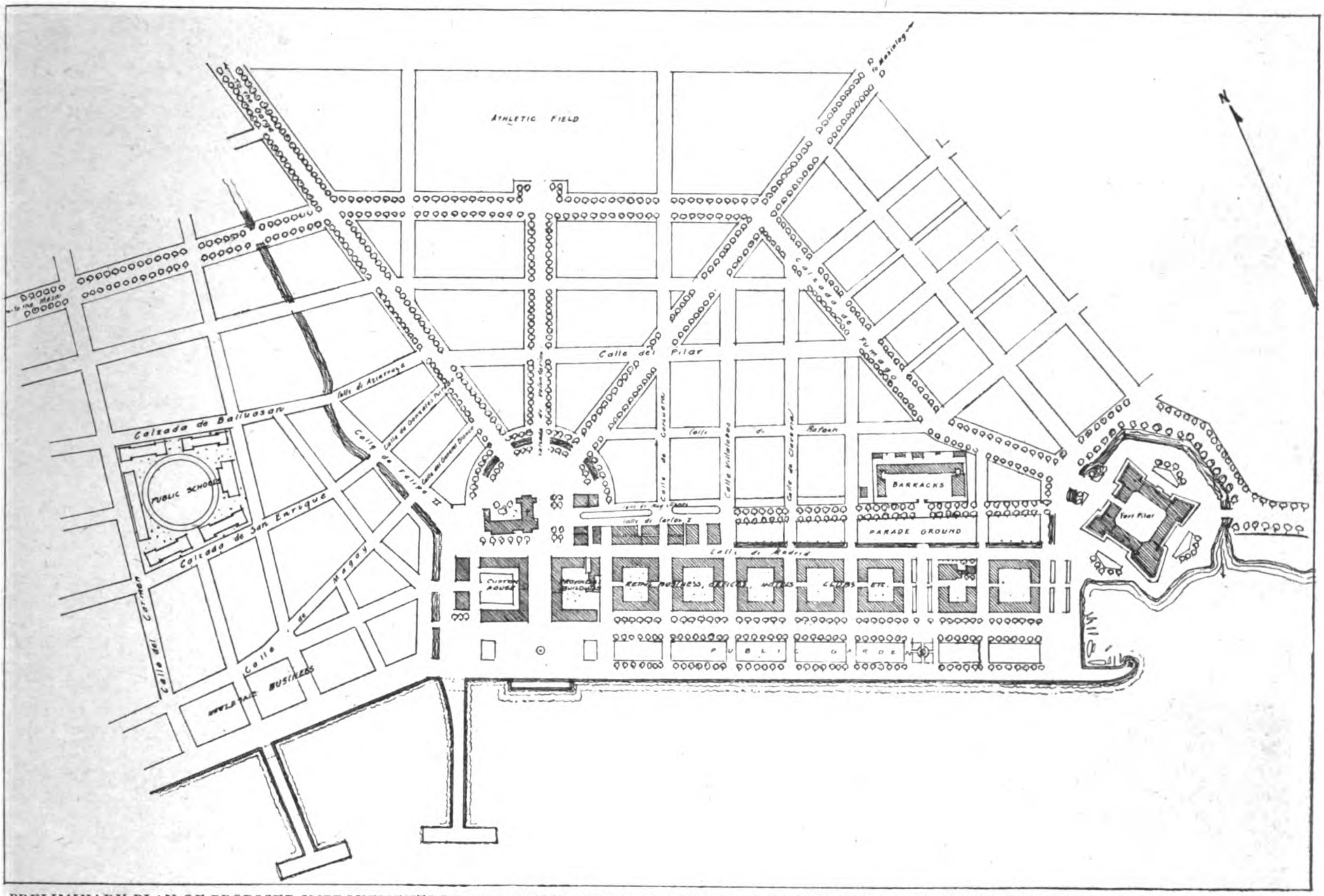
The section best suited for this purpose at Zamboanga is the site of the present Moro Village, where a considerable amount of business is now transacted. In this section, alone, is there room for unlimited expansion. Mr. Parsons recommends that the temporary pier be replaced by a permanent one on a line about 300′ W. of its present position. This location has the advantage of being near the future custom house and shipping center. Moreover, the development of the civic center as a monumental feature requires an unobstructed view of the sea at this point, while the removal of the noise and dust incident to traffic will be an advantage.

In connection with building for retail business, are considered offices for general business and professional purposes, hotels, apartments, and club houses. Additional area is provided for these by reclaiming from the sea a strip of land about 420′ in width. By this means blocks of about 250′×300′ are obtained giving an opportunity for buildings with an exposure both to the sea and on Calle Madrid and the parade grounds. The open courts, around which the buildings are built, may be treated in a variety of ways according to the purposes of the building. On the waterfront the buildings will be preceded by an open space 200′ in width used as a public garden, with roadways, paths and grass plots to diminish the reflection of heat and glare of light. A few trees will be planted here, but not enough to obstruct the view.

Land thus reclaimed at a comparatively small cost becomes public property and will be leased by the government to individuals for a long term of years, affording a considerable public revenue. The cost at Manila of reclaiming ground by means of the hydraulic dredge *Manila*, owned and operated by the Atlantic, Gulf and Pacific Company, Inc., of New York and Manila, is 22 *centavos* (11c gold) per cubic meter. At this rate, if the average depth to be filled at Zamboanga is 3 meters, the cost, once the riprap bulkhead has been constructed, will be 66 *centavos* (33c gold) per square meter



PRESENT SITE OF THE CITY OF ZAMBOANGA, CAPITAL OF THE MORO PROVINCE



PRELIMINARY PLAN OF PROPOSED IMPROVEMENTS IN ZAMBOANGA, PREPARED BY MR. W. E. PARSONS, CONSULTING ARCHITECT TO THE PHILIPPINE COMMISSION, AND RECENTLY ADOPTED BY THE LEGISLATIVE COUNCIL OF THE PROVINCE; NOTE THE UNIQUE ARRANGEMENT OF THE PUBLIC SCHOOLS

of land. Provision will be made in the land leases for the erection of buildings of a proper construction and character, assuring in this way an impression of architectural unity. Such a group of buildings along the water front with the public buildings of a monumental character at one end and the Spanish Fort del Pilar at the other, together with the tropical foliage of the public gardens, will give the city an imposing and quite unique appearance. An effort in this direction will be well invested as an advertisement in view of the fact that the city is seen from many ships passing through the Basilan Straits.

SECTIONS FOR RESIDENCES.—The section suitable for residences is quite restricted in area, only that on or near the waterfront being really desirable. To the E. of Fort del Pilar is only a narrow strip of good land and that will probably be required for military purposes. The ground on the N. is, in its present condition, undesirable for dwellings.

In these circumstances Zamboanga is especially fortunate in having within 3 or 4 ms. such attractive building sites as are offered on the foothills and mountain slopes towards the N. To give this section direct and easy access, the plan provides an avenue 130′ in width leading in a straight line from the center of the city to the gorge. With an unbroken line of shade trees on either side, and with the dome-shaped hilltop at the end of the vista, this avenue will be a feature of exceptional beauty as well as utility. For a part of the distance it will lead nearly parallel to the river. The intervening space of about 100 yds. may form a part of the park system, through which may pass the electric railroad when required.

This section will be set aside as a reservation and with the aid of a topographical map receive careful study with a view to establishing a system of connecting drives of gentle grade. Such drives will be laid out at first at small expense as trails or 5′ wagon roads, but will be on the final location of the future drives. Roads of steeper grade, when necessary, will lead to the desirable building sites. The gorge itself, with an encircling drive so that a view from all points may be afforded, will be preserved as a part of the park system and preserved in its present beauty. The surrounding hillsides will be dotted with villas and bungalows. The *mesa*, E. of Zamboanga, will also offer excellent sites for residences.

SYSTEM OF STREETS.—The system of streets shown on the plan provides communication along the waterfront and in three lines converging to the public *plaza* in the center of the city. One of these avenues, leads directly to the gorge as described above, another to Masinlog. There is also a broad avenue forming practically the perimeter of the present town site and intersecting the radiating avenues. These avenues are expected to accommodate the through traffic and to be the location for electric roads that may be constructed. The areas between these avenues are divided into rectangles by streets of convenient width. In this sense the present system is preserved, with the criticism, however, that the streets as at present located are too near together and the plots too small. Plots of the size shown on the plan will afford building lots of more suitable size; at the same time the number of streets is diminished, and consequently the cost of maintenance.

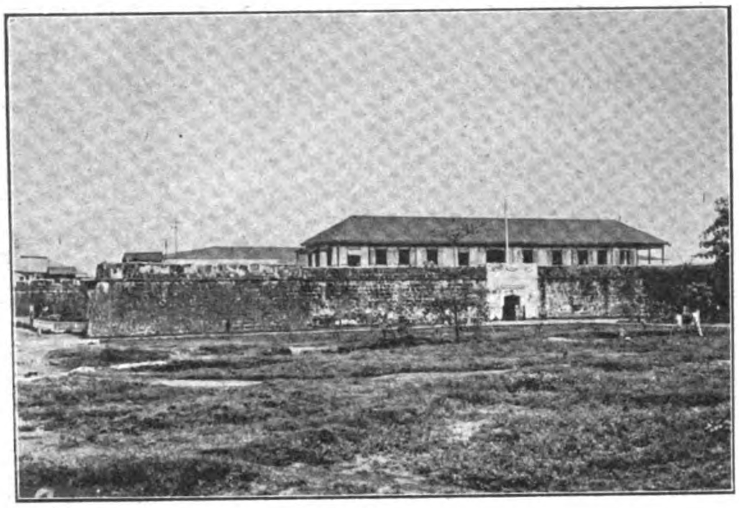
In the outlying sections occupied by the native population it is recommended that building laws prohibit the erection or repairing of dwellings nearer the street than as prescribed distance. As the nipa huts are temporary structures of short life, the streets may be gradually widened. Where houses are of such inflammable material it is important that they be separated at intervals by wide streets, in order that conflagrations may be confined to comparatively small areas.

In the preparation of this plan, effort has been made to avoid the condemnation of any valuable improved property. The rearrangement of some of the streets N. of the center will require a readjustment of properties, but since most of the buildings in this section are of nipa it is thought that the desired changes may be made without great expense.

PUBLIC PARKS FOR RECREATION AND AMUSEMENT.—Until a few years ago the parade grounds were well suited for this purpose, but the buildings erected along the shore now obstruct the air and view of the sea. The public gardens along the *quai* on the area to be reclaimed are intended to restore this attractive feature of the old town. These gardens will be adorned with tropical plants, and provided with a bandstand, seats, and every provision for comfort.

The grounds surrounding Fort del Pilar, unless necessary for military purposes, will be included in the park system, provision being made for the laying out of grass plots and planting of shade trees, arranged in the form of the outlying bastions which usually surround such fortifications.

In this connection may be considered the canal. Constructed originally as a water supply, this palm-shaded, many-bridged canal has become the most picturesque feature of the town, and will, if possible, be preserved on this account. Through that part of Calle Madrid where additional roadway will be required, the water may pass underground, reappearing along the edge of the parade ground. If the banks are made somewhat steeper and well sodded with grass, this canal



FORT ZAMBOANGA

MODERN AMERICAN COTTAGE AT ZAMBOANGA

can be kept in sanitary condition. By making its outlet into the sea just beyond the fort its course is shortened and its current consequently made more rapid.

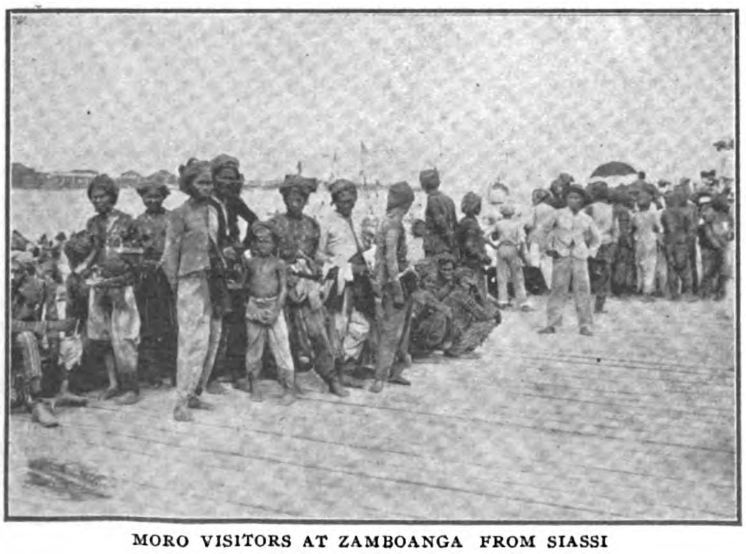
The use of trees for shade seems to have been quite ignored by the natives and except in a few cases by the Spanish To Americans it seems that in a tropical climate well-shaded avenues are almost a necessity while esthetically the opportunity for luxurious tropical foliage of contrasting shades and colors is one not to be neglected. A difficulty for which provision has been made, is that of obtaining young trees in sufficient quantities for transplanting. A nursery for the cultivation of these young trees will be established immediately.

METHODS OF CONSTRUCTION.—The first essential in good architecture is the adaptibility to climatic and other local conditions. The Spanish builders felt instinctively the truth of this, and after an experience of three centuries have produced in the Philippine Islands an architectural style both beautiful and practical. The most successful builders depend for their effect more on their beautiful proportions, their simple wall surfaces and tile roofs, rather than on decorations and the use of expensive materials. It is expected by Mr. Parsons that the modern use of concrete, strengthened by steel rods to resist the tensile stress caused by earthquakes, will prove to be a more economical and durable method of construction than the use of timbers. Mr. Parsons says the use of galvanized iron for roofs in place of tile is to be regretted. Tile roofs are better adapted to resist the heat than iron and are in the long run more durable and economical.

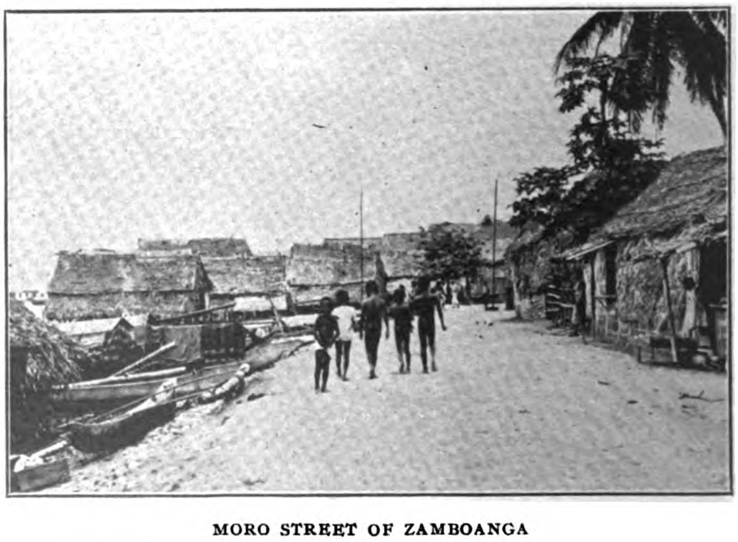
Such a plan for the development and expansion of Zamboanga as the one presented is based on future rather than present requirements. It is not expected that such improvements will be made at once, but will progress step by step over a long period of years. By keeping pace with the development of the Moro Province, along a definite and well-defined plan, Zamboanga has the opportunity of becoming an important city of convenient arrangement and unusual beauty. This is the view expressed by Mr. Parsons and enthusiastically concurred in by the progressive members of the Legislative Council

ON THE ROAD TO ZAMBOANGA

A TURTLE "RANCH" AT ZAMBOANGA



MORO VISITORS AT ZAMBOANGA FROM SIASSI



MORO STREET OF ZAMBOANGA

CHINESE COLONY OF ZAMBOANGA

FRANCISCO BARRIOS,

Head of the Firm of Barrios & Co., Zamboanga

Today, in the Moro Province, the bulk of the import and export business is done by the Chinese. For more than a generation they have been delving out the wealth of the forests and the sea and sending in abroad, and have been paying for it in cloth, brassware, beads, nicnacs, and even food-stuffs. In traveling about the province one everywhere meets the Chinese trader. He will undergo hardships and dangers to carry on his trade, and his reputation, nine times out of ten, is that he is *square*, and able to fill all contracts that he may make.

At the present time Francisco Barrios & Co., of Zamboanga, are easily the largest import and export house doing business in the Moro Province. The firm was established in 1860 by the father-in-law of Francisco Barrios, the present head of the firm, who has, himself, been in the business since 1891. Beginning in a small way as army and navy contractors, the firm now controls a large percentage of the entire business of the province. The exports handled are hemp, copra, dried fish, beeswax, lumber, etc., etc., while the imports, from Europe, Singapore and China, comprise every article that the mixed population of the province demands. The agents of Messrs. Barrios & Co. are scattered almost everywhere throughout the province, and scarcely a *sapit* or *vinta* puts in at Zamboanga that does not bring some cargo for the firm. Francisco Barrios, the present head of the firm, is noted not only for his shrewd business judgment and integrity, but for his loyalty to Americans and his philanthropy. He is still a young man. He was reared to the Catholic faith. When the Americans first went to Zamboanga and put an end to the local strife between the Moros of the district and the Chinese and Filipinos residing there, they were received with open arms, as it were, by Señor Barrios, who has since done all in his power to assist in the pacification of the country and the establishment of civil government. It is related that during the days of American occupation an army paymaster was slow in following the troops, who became very much dissatisfied over the long delay in getting their pay. Señor Barrios stepped into the breach and offered to the proper officer to advance the necessary funds. The offer was accepted and the troops paid, but it was not until some years had elapsed that the $10,000 advanced by Señor Barrios was repaid, and then it was only by a special act of congress. The headquarters of Francisco Barrios & Co. occupy a large building adjoining the customs wharf, practically in the heart of Zamboanga's business district. The firm has a large general store, ship chandlery department warehouses, a lumber yard and steamship offices. It constantly employs a large force of men getting out native timber and sawing it by hand into marketable lumber. Señor Barrios has won the respect of the provincial government to such an extent that he is permitted to have a store within the precincts of the Moro Exchange, in which only cash transactions are permitted. He is the only merchant, other than Moro, permitted to do business in the exchange. Francisco Barrios & Co. are agents for Compañia Maritima and for the M. Palanca line of steamers, from Manila.

Among the old-time Chinese merchants of Zamboanga is Luis Montojo Soolay, who established a place on the Escolta 22 yrs. ago. In addition to carrying on a general merchandise business, he buys hemp and exports inland produce.

Yo Boon Kia became a member of the Chinese mercantile community in 1885, and has become a successful commercial man.

Among the other leading merchants of Zamboanga, who are recognized business men, are Chan Boon Liat, Sua Po, Te Bang, Yo Tsing, Chu Lian, Yap Cheng, Uee Ahya, Yap Tiaslay, Ong Bunlin, Ong Pue, and Lim Pu. In addition to the above-mentioned there are about 75 other Chinese in business in Zamboanga alone, who desire to see the country flourish and progress.

The Chinese residents of Zamboanga, and, indeed, of the whole Moro Province, are good citizens, progressive in spirit, and they all contribute a considerable amount in taxes to the support of the province. Several of the leading members of the Chinese Colony belong to the Zamboanga Chamber of Commerce and they are always willing to participate in any movement for the encouragement of trade, and to coöperate with the American and other merchants. Many of them are interested in the agricultural development of the province—particularly in hemp and copra. They have materially assisted in the development of the dried-fish industry in Zamboanga— to such a degree that it promises some day to become of great commercial importance. Chinese capital and Chinese brains are always active in Zamboanga.

SOUTH PHILIPPINE STEAMSHIP CO.

The development of the coasting trade throughout the southern islands is a matter of very recent origin, and can scarcely be said to have yet passed the experimental stage. Distances are long, ports are comparatively few, navigation is difficult, and cargoes are uncertain. The business is one which must grow and expand with the country.

The pioneer concern in the Moro Province coastwise trade is the South Philippine Steamship Company, which was organized at Zamboanga about 1 yr. ago. Its equipment consists of two small wooden steamships, only one of which, *Borneo*, is actually engaged in the trade. The other boat is *Sabah*, which is under charter to the United States Government, and has been serving as Major General Wood's dispatch boat. These vessels were built at Sandakan, Borneo, especially for this trade, and have proved very satisfactory.

Shortly after its organization and at the suggestion of General Wood, the company arranged a regular schedule of ports of call which have been closely adhered to, a fact that has added very materially to the popularity of the line. The Coast-Guard (government) service, which partially covers the same route, is very irregular and unsatisfactory to the residents of the Moro Province to say nothing of the fact that the passenger fares and freight rates are higher.

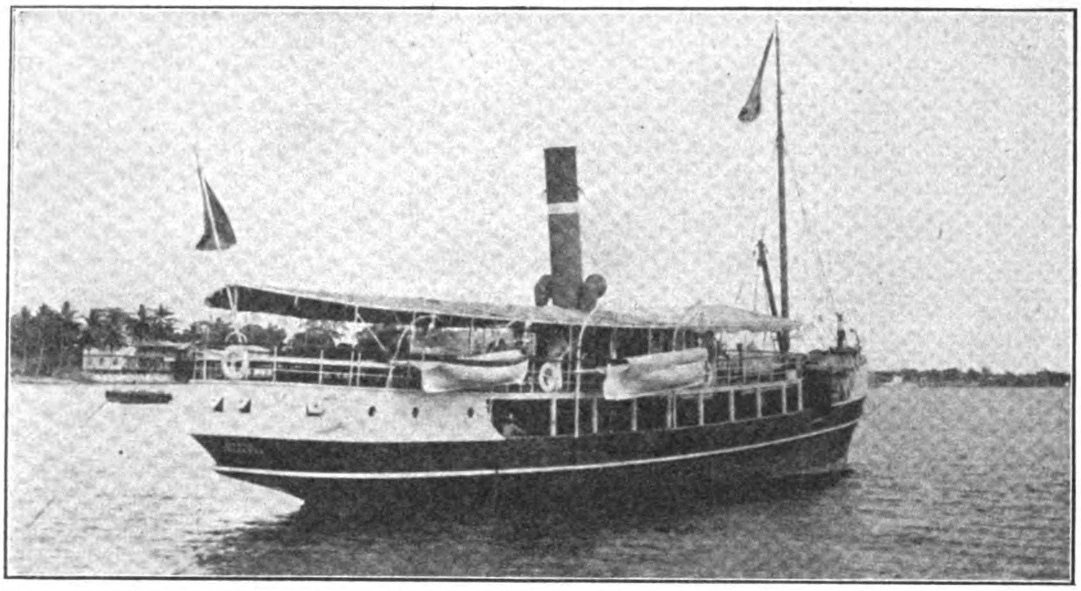
It has been the policy of the South Philippine Steamship Company to accommodate its patrons as much as possible. The planter in distant Davao can figure definitely on the cost of his goods laid down at Davao. In the additional role of trader the company is also of valuable assistance to the trader. Consultation of the large map of the Moro Province, to be found elsewhere in this issue, will make clear the ports of call made by *Borneo*.

The firm of Darby & Co., managing agents of the South Philippine Steamship Company, has its head offices in Sandakan, where it has been established for many years. The offices in Zamboanga were opened about 18 mos. ago. The firm also does a general merchandise business, exporting copra, rice, forest products, and timber. Mr. Darby, senior member of the firm, resides in Sandakan, but visits the Zamboanga branch about once a month. Among the Agencies of Darby & Co. are the China Navigation Company, the China Mutual Fire Insurance Company, and the Sabah Steamship Company.

SCHEDULES OF ROUTES AND TIME TABLE OF S. S. *BORNEO*

NOTE:—The Timetable for intermediate ports and for arrival at Zamboanga are approximate only, and may be varied by the master of the vessel as conditions may require.

BUSINESS HOUSE OF MESSRS. BARRIOS & CO., AT ZAMBOANGA



STEAMER *BORNEO* OF THE SOUTH PHILIPPINE STEAMSHIP COMPANY

ROUTE I.

PORT OF DEPARTURE	DATE	HOUR.
Zamboanga	1st	6 p. m.
Dapitan	2d	8 p. m.
Iligan	3d	6 p. m.
Cagayan	4th	6 p. m.
Dapitan	5th	10 a. m.

PORT OF ARRIVAL	DATE	HOUR.
Dapitan	2d	12 m.
Iligan	3d	6 a. m.
Cagany	4th	6 a. m.
Dapitan	5th	6 a. m.
Zamboanga	6th	noon.

NOTE:—The legislative council may substitute any part between Zamboanga and Iligan for Cagayan or Iligan, *provided* that number of ports of call is not increased thereby. In any case Dapitan will be touched on both outward and return trip.

ROUTE II.

PORT OF DEPARTURE	DATE	HOUR.
Zamboanga	8th	5 p. m.
Jolo	9th	9 a. m.
Siassi	9th	6 p. m.
Bongao	10th	6 p. m.
Siassi	11th	6 p. m.
Jolo	12th	5 p. m.

PORT OF ARRIVAL	DATE	HOUR.
Jolo	9th	6 a. m
Siassi	9th	2 p. m
Bongao	10th	6 a. m.
Siassi	11th	6 a. m
Jolo	12th	6 a. m.
Zamboanga	13th	6 a. m.

ROUTE III.

PORT OF DEPARTURE	DATE	HOUR.
Zamboanga	14th	4 p. m.
Davao	16th	noon.
Matti	17th	6 a. m.
Davao	18th	1 p. m.

PORT OF ARRIVAL	DATE	HOUR.
Davao	16th	6 a. m.
Matti	17th	6 a. m.
Davao	18th	9 a. m.
Zamboanga	20th	noon

NOTE:—Upon arrival at the port of Davao on the outward voyage the vessel shall be required to proceed to any one point in Davao Bay indicated by the Governor of the District of Davao, when the freight and passage money, inward and outward for such point amounts to fifty pesos Ph. Cur.

ROUTE IV.

Zamboanga to Jolo and Siassi and return. This route shall be optional for the vessel and no subsidy shall be paid for the same when performed.

ROUTE V.

PORT OF DEPARTURE	DATE.	HOUR.
Zamboanga	26th	6 a. m.
Cotabato	28th	12 m.
Parang	28th	6 p. m.
Malabang	29th	12 m.
Tucuran	29th	8 p. m
Margosa Tubig	30th	12 m.

PORT OF ARRIVAL	DATE	HOUR.
Cotabato	27th	12 m.
Parang	28th	3 p. m.
Malabang	29th	6 a. m.
Tucuran	29th	4 p. m.
Margosa Tubig	30th	8 a. m.
Zamboanga	1st	8 a. m.

NOTE:—The legislative council may substitute any port or ports between Zamboanga and Cotabato for any of the ports herein mentioned, provided that the number of ports of call is not increased thereby. The master of the vessel may, with the consent of the Governor of the Moro Province, reverse or otherwise change the order of calls in Route V. when conditions require it, but such reversal or change shall not affect the rates of freight, and passage for any Port.

Like all cities favorably situated with reference to trade and commerce, Zamboanga offers remarkable values in real estate. A city today of 20,000 population, it offers lots practically in the heart of the business center from $50 to $1,000, which in a few short years will increase in value from 20 to 50-fold.

ICE AND COLD STORAGE PLANT AT ZAMBOANGA

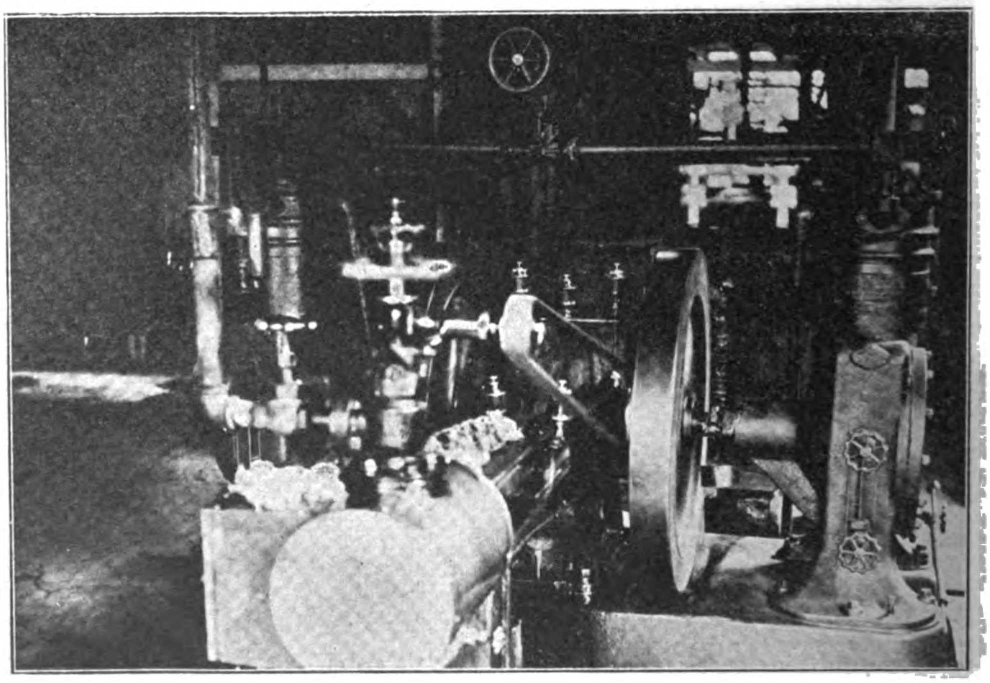
Zamboanga can boast of an up-to-date ice and cold storage plant that is operated on a business basis and has already become a handsome dividend-paying concern. The company, which was incorporated in August, 1905, under the name of the Zamboanga Cold Storage Company, was organized nearly 2 yrs. ago through the efforts of Mr. P. F. Williamson and others. It is a stock company, with a capital of ₱40,000, one-half paid up. The public-at-large was given opportunity to subscribe, the shares being placed on the market at ₱100 per share. There are many small holdings.

A Vulcan ice machine, built by the Vulcan Iron Works, San Francisco, Cal., having a capacity of 3 tons per day, was installed in May, 1904, and has since been in constant operation giving eminent satisfaction and a reliable, clear output. The cold storage capacity has not yet been utilized.

Despite the fact that the military has a cold storage plant of its own, the Zamboanga Cold Storage Company did a good business during the first year of its existence, and was able to pay a dividend of 10 per cent. The prospects for the second year are even more flattering.

Mr. P. F. Williamson is now president of the company, Mr. P. J. Moore secretary, and Señor Francisco Barrios treasurer.

Recently the South Philippine steamer *Borneo* was supplied with an ice tank, and has begun to furnish ice to outposts in all parts of the Moro Province, this feature giving a considerable impetus to the business of the cold storage company.



ICE-MAKING MACHINERY AT ZAMBOANGA COLD STORES

MESSRS. WILLIAMSON BROS., REDDING & CO., TIMBER MERCHANTS

One of the firmly-established firms of Zamboanga is that of Williamson Bros., Redding & Co., dealers in sawlogs, wood, and various island products. The firm was organized in 1900 with the express purpose of building up trade direct with the United States. P. F. Williamson and F. W. Redding had previously served with the United States volunteer forces in the northern islands, and it was that country which first attracted their attention; but, after carefully looking over the field, they decided that the Moro Province offered the greater possibilities, and finally they established offices at Zamboanga. Today they are satisfied with their choice. They have engaged in various lines—mining, planting, exporting and importing, and even shipbuilding. The conditions existing during the first few years were not favorable. There were no banks, and business men abroad were hard to convince of the advantages to be gained by direct trade with so distant and unsettled a province. However, the firm has prospered, and has laid broad and deep foundations.

Messrs. Williamson and Redding are firm believers in the future of Zamboanga as a commercial center, and of the Moro Province as a vast storehouse of mineral, agricultural and forest wealth, awaiting the developing energy of the Americans.

One of the most interesting experiences of Messrs. Williamson and Redding was in the location and partial development of a large bed of bituminous coal on the Sibugay River, about 70 ms. N. of Zamboanga. During 1901-02 four veins of valuable coal were uncovered, one measuring 8′ in width and the other three 5′ each. Samples of the coal were tested by the Navy Department, by the Quartermaster's Department of the United States Army, the Amphere Electric-Chemical Company, of New York City, and others, and reports in every instance were most flattering. The Navy Department reported that it was 63 per cent of the value of Pocohontas coal. The decision of the Amphere Electric.Chemical Company was, "A good steaming coal; burns freely."

Messrs. Williamson and Redding even went so far as to take out several hundred tons of this coal, which brought a good price in Zamboanga, but owing to the then unsettled condition of Mindanao, the necessary capital for properly developing the mine could not be secured. The mining laws and prevailing local conditions make it necessary to have a large amount of cash capital for such an enterprise. General Davis, when in command of the Department of Mindanao, took great interest in this matter, and made an official report on it.

Considering the fact that Basilan Strait must some day be the great highway for ocean traffic from the Panama Canal to Far Eastern ports, and Zamboanga necessarily a great coaling port, there is every reason to believe that the Sibugay property will be developed at no very distant day.

Soon after their arrival in Zamboanga, Messrs. Williamson and Redding acquired by purchase a fine piece of property with a sea frontage of 164′, adjoining the military reservation, where they have established their offices, warehouse and yard. They have made a close study of the native peoples along the coast and have won their confidence to such an extent that any member of the firm can go alone among them for weeks and months without fear of being molested. Mr. Redding has learned to read and write Moro, and to speak it as well.

The experience of the firm in attempting to establish direct trade with the United States was instructive. One of the valuable forest products is almaciga, which is the base of copal varnish. It is quite plentiful, and can be secured through the Moros and wild people of the interior. The quoted price of almaciga in the trade journals of the United States is more than double its market value in Moroland, and yet when correspondence with several prominent varnish manufacturing companies in the homeland was opened, it was found that none of them would undertake to receive shipments except under the most exacting and discouraging conditions. So it was in other lines this trade must be carefully fostered and built up.

Mr. Redding discovered placer gold on the Coruan River, about 35 ms. N. of Zamboanga on the E. coast of the peninsula. He spent 6 mos. there in prospecting and washing. While not a practical miner he saw enough to convince him that with a fair amount of capital, a capable miner could obtain rich results. The gold is coarse and water plentiful.

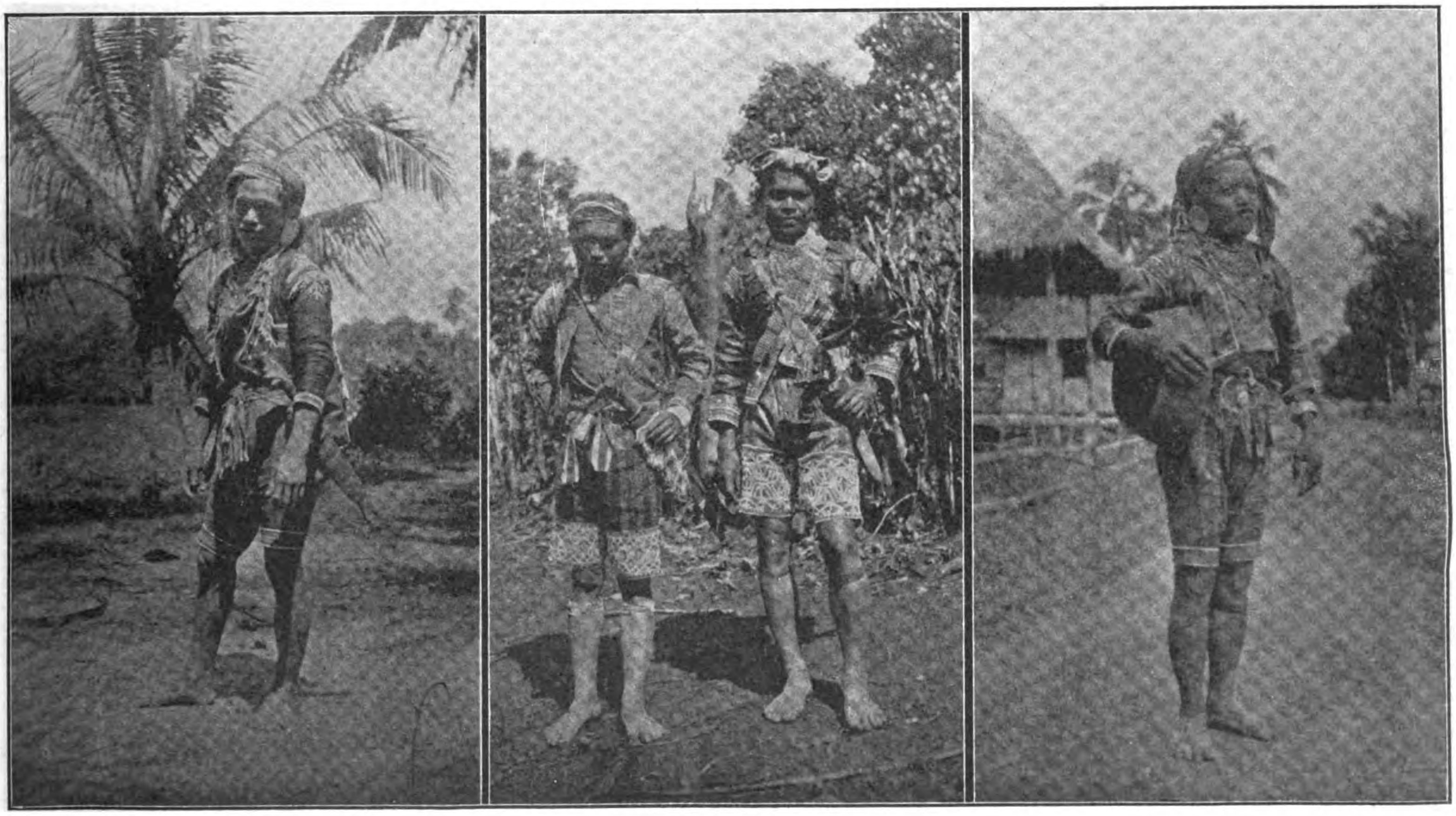
The country about Sibugay Bay is splendidly adapted to the cultivation of hemp and cocoanuts, and there is room there for thousands of settlers. Mr. M. A. Clarke, of Manila, established a cocoanut plantation there 2 yrs.ago, of which William Girvan is the manager. Already 10,000 trees have been set out. The country is well watered, the soil rich, and the rainfall reliable.

Messrs. Williamson and Redding acquired by purchase a tract of land comprising about 300 acres, on the W. side of Sibugay Bay. That was about 2 yrs. ago. There are 800 bearing cocoanut trees on the place and the promoters are preparing to set out 5,000 more trees during the present year. They will also go extensively into rubber. They already have 500 para and ceara trees in the nursery ready to plant, and have ordered 5,000 more seedlings from the best markets.

The Sibugay Bay country is already attracting a great deal of attention, not only on account of the favorable opportunities it offers in the way of agricultural lands, but because of its proximity to Zamboanga. Messrs. Williamson and Redding expect to have a good launch plying between their plantation and Zamboanga within a few months' time.

At the present time Messrs. Williamson and Redding have a large force of men at work in the forests getting out molave, ipil, and other hard timbers which are marketed by the firm in their rough state. The firm has the contract to supply the flooring of the new provincial building at Zamboanga, now in course of construction. The flooring will be selected molave, hand sawed, and polished. Molave is considered by many to be the most durable and beautiful of all native woods, and the flooring will be one of the features of this building in which nothing but native woods will be used. Messrs. Williamson and Redding are also prepared to fill orders for all kinds of piling and rough-hewn timbers.

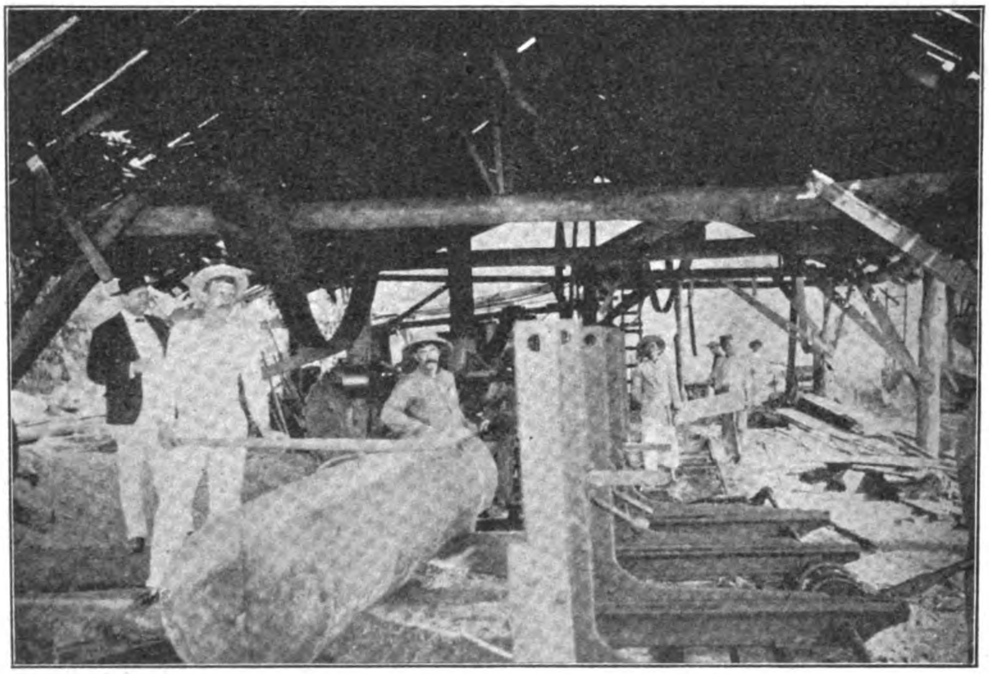
Williamson Bros., Redding & Co. will be pleased to correspond with all who are interested in Zamboanga and the Moro Province, and who are desirous of investing there. Their knowledge of the country, the people, the products, resources and trade conditions is gained from long experience and can be relied upon. Their cable address is "Potts," Zamboanga, and they use the A 1 cable code.



BOGOBO LABORERS IN THE FANTASTICAL ATTIRE OF THEIR TRIBE

MESSRS. BEEBE, LYON & CO'S SAWMILL AND LUMBER INDUSTRY

The development of the saw-milling and lumbering industry in the Moro Province has been necessarily slow and difficult, owing to the many obstacles to be overcome. The greatest wealth in the province, perhaps, is in its forests. The entire belt, from the 8th parallel S. to the Tawi-Tawi Group, contains vast forests of hard woods of the most valuable kind and many varieties more easily worked that have a steady market throughout the Far East. Most of the timber is, however, far from established settlements; transportation is difficult, costly and uncertain; labor is unskilled, unreliable and ignorant, and the demand is so variable as to make returns uncertain. Hitherto, the American authorities have had to depend upon the accumulated experience of the Spaniards, which has in many instances proved misleading, their data being indefinite and pertaining to some particular locality. It takes capital, nerve and truly American enterprise to win under such conditions.



INTERIOR OF MESSRS. BEEBE, LYON & CO'S SAWMILL AT PUERTA ISABELA, ISLAND OF BASILAN

It is, therefore, with pride that the business people of Zamboanga refer to the success of Messrs. Beebe, Lyon & Co., not only as a pioneer concern, but one that has become firmly established in the lumber business. It is the only notable concern in the Southern Islands today which saws and markets native lumber, and that alone. During the last few years various companies have shipped into the Philippine Islands, from the United States, a very large amount of American pine and redwood, amounting probably to between 2,000,000 and 3,000,000′ per month. This has come directly into competition with the native lumber and made the establishment of mills throughout the Islands more difficult. With a well equipped sawmill at Puerta Isabela, Basilan Island, and firmly established and well stocked yards at that place, at Zamboanga and Cebu, the firm of Beebe, Lyon & Co. is in a position today to supply the provincial markets with all of the native timber that they demand, at prices to suit.

It has required infinite labor and patience, and a considerable amount of capital, to place Beebe, Lyon & Co. where they are today. It was in May, 1902, that the first post of the sawmill at Puerta Isabela was set up. Mr. F. C. Lyon, a thorough mill man, and one who had had about 14 mos.' experience in handling native hard woods, first saw the advantages of handling the timbers found in the Moro Province. After making a thorough examination in some of the best known districts, he found that the most practical place to start was on the Island of Basilan. In the fall of 1902 the mill at Puerta Isabela commenced operations. It was equipped with an Aultman-Taylor circular saw—top and bottom—capable of cutting a 5′ log. This arrangement was eventually enlarged so that it could cut a 6′ log, bringing the capacity of the mill up to 8,000′ of hard lumber per day. It was originally built to cut 10,000′ of American pine. In addition, there is a woodworking machine—edger—with a 24′ table, and a 24″ surfacing machine manufactured by A. J. Adtkinson & Co. By the use of inserted teeth on the main saw, Mr. Lyon has found that he could cut the hardest native timber as readily as the softer varieties.

Mr. Lyon has personally conducted the mill during the entire time of its existence, has been his own engineer and filer, and has sawn every stick of timber that has been cut there. He is a man of large frame, iron constitution and indomitable will. He had to learn to adapt American methods to tropical milling, to judge and class the various native timbers, and hardest of all, to handle such labor as the country afforded. It took patience and untiring effort, but he accomplished it. Mr. Lyon is today probably better versed than any man in the Philippines, upon the subject of saw-milling in the tropics.

Messrs. Beebe, Lyon & Co. received from the government a generous concession of land adjacent to Puerta Isabela, to which their efforts have been thus far confined. Under the existing conditions, only such timber as is found upon land sloping toward the sea or a deep river can be taken out. Not in any case has timber been cut more than 5 ms. back from the coastline. The timber is taken out for the most part by Filipinos, under contract. They are paid by the cubic foot for logs delivered at the mill. The logging is all done by means of carabaos. When a tree is felled, the butt is sharpened, and it is then hauled by carabaos to the nearest water. The hard wood is all too heavy to float, so that it must be buoyed up with lighter logs. The rafts thus made are floated down to the sea, where they are held for a favorable tide upon which they can be carried down to the mill. An amusing incident of the carelessness and indifference of the Filipino was observed a short time ago. A number of rafts were coming along on a full tide toward the mill. Upon the foremost raft the native in charge was seated in a reclining position, indifferently smoking a cigarette and twanging on a guitar. When the raft reached the point where it devolved upon the raftsman to seize the rope, he was so engrossed in his amusement that he neglected the opportunity and the whole line of rafts slid by the mill and was carried on for a distance of 8 ms. before they could be checked. On the return tide, the following day, the rafts came back, and strange to relate, the same occurrence was duplicated. It took nearly three days to land the rafts at the mill, yet the Filipino did not think that he lost any money on the deal. Sleds, chutes nor railways can be used on the Island. The various kinds of timber are found in distinct groups. The company pays to the government the regular forestry dues on all timber cut, which, in itself, is a heavy tax, but pays nothing else for its concession. Under the existing conditions, it is sometimes difficult to get any communication to the proper authorities, and considerable time and expense is involved before the dues can be paid.

There is no skilled labor obtainable in the district, nor, in the opinion of Mr. Lyon, can the native labor be trained to do more than the rough work about the mill. The Yacanes, or natives of Basilan, are wild people, unaccustomed to hard work, and have been found to be utterly worthless as mill hands. Better results have been had from Moros and Filipinos, and they learn to become fairly faithful, but can not be trusted with other than the rough work. From the beginning, Beebe, Lyon & Co. determined to pay top-notch wages, and today are paying 80 cents Conant, for 10 hrs.' work, which is the highest wage paid in the province.

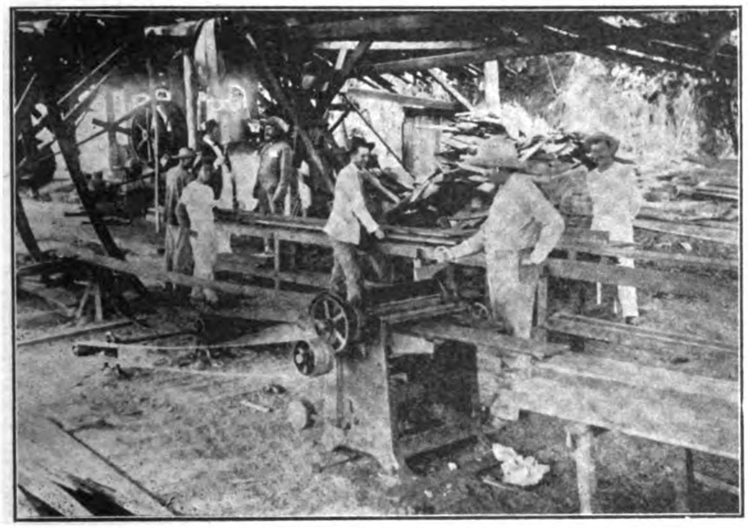
CLASSES OF LUMBER.—The following notes on the classes of timber from Basilan, cut in Beebe, Lyon & Co's. mill, will be of interest:—

Molave.—Known as the *queen* of all native timbers. Grows to a height of from 18 to 50′, and the logs run from 18 to 26″ in diameter; is very hard and tough, with frequently a beautiful grain, susceptible of a high polish; is not attacked by insects and stands any kind of weather; is the best piling known. Some timbers of Molave, which were cut 27 yrs. ago for the Spanish Marine Hospital at Puerta Isabela and have since lain on a hillside, were recently sawn up in Beebe, Lyon & Co's. mill, and found to be perfectly sound. They have been used in the construction of the new government building at Zamboanga. Molave is easily cut, either green or dry. Beebe, Lyon & Co's. mill has cut about 100,000 feet.

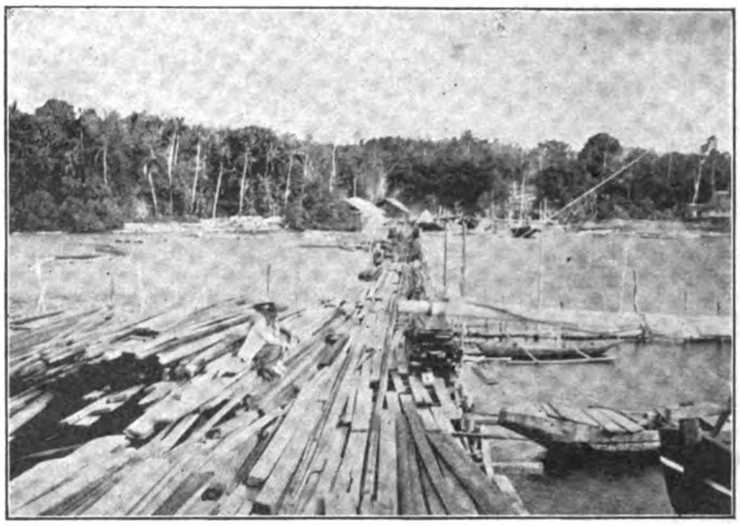
Ipil.—A hard wood, dark red in color, and one of the finest general building material found in the Islands. Logs are cut from 50 to 70′ in the clear, and from 14 to 40″ in diameter. This wood ranks among the most valuable, is easily cut and finds ready sale. Beebe, Lyon & Co's. mill has cut about 150,000′.

Yacal.—Grows to a height of 70′ in the clear; logs measure from 14 to 30″ in diameter; is hard and very strong, able to bear a severe strain; is used for the keels of vessels, for boat-building, sternposts, bridging, etc.; is very durable. Brings a good price in the market. Beebe, Lyon & Co's. mill has cut about 200,000′ of this wood.

Pagatpat.—A hard wood which grows in salt water along the seacoast and is particularly valuable in shipbuilding. Is dark brown in color, very tough, stands exposure to tropical



EDGER AND SURFACING MACHINE, MESSRS. BEEBE, LYON & CO.



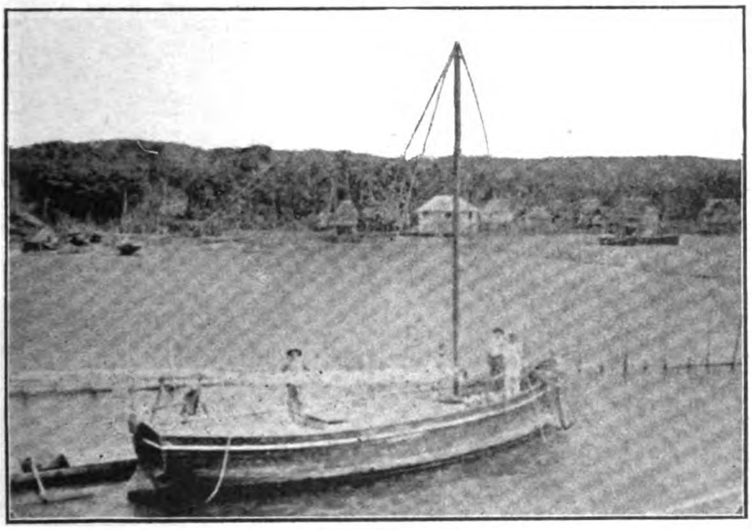
MILL, DOCK AND LUMBER SHIPMENT, MESSRS. BEEBE, LYON & CO.

heat and rain without cracking and stands a heavy strain. Logs measure from 60 to 70′ in length, and 12 to 45″ in diameter. Beebe Lyon & Co's. mill has cut about 200,000′.

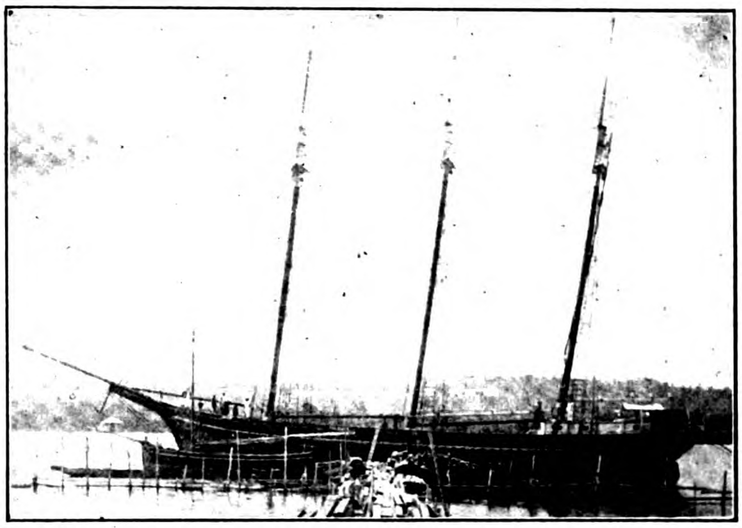
Camagon (*bastard ebony*).—Is one of the finest of the hard woods. The outer portion is light in color and the heart red and black. It is capable of a high polish and makes very fine furniture. Logs measure from 30 to 50′ in length, and 12 to 30″ in diameter. The heart measures from 3 to 8″ in diameter. Has the log usually showing a bird's-eye effect that is very pretty and unique in tropical woods. Beebe, Lyon & Co.'s mill has cut 250,000′ of this timber.

Lumbauyau.—Is fairly plentiful. It seems to be peculiarly proof against the climatic conditions and the attacks of insects that destroy imported lumber. Logs measure fom 50r to 80′ in length, and 12 to 90″ in diameter. It is used in the manufacture of sash and doors, in furniture, and in general house construction. company's sloop, *Helena*, about 15 tons, make three trips a week across the Basilan Straits (20 ms.) carrying 7,000′ each time.

In October, 1905, after the big fire at Cebu, Beebe, Lyon & Co. established a yard at that point with a supply of 200,000′ of all kinds and dimensions. In order to supply the yard the company purchased the American schooner *Peerless*, 225 tons. The *Peerless* was built at Seattle, and is a 3-masted schooner 127′ in length, 35′ beam and 9′ hold. It has a capacity of



SLOOP *HELENA*, PROPERTY OF MESSRS. BEEBE, LYON & CO., PUERTA ISABELA IN BACKGROUND



SCHOONER *PEERLESS*, PROPERTY OF MESSRS. BEEBE. LYON & CO.

properties of ebony. Beebe, Lyon & Co's. mill has cut about 25,000′.

Guijo.—Is one of the most plentiful varieties of hard wood. It is used in all kinds of general construction work; is standard and valuable. Logs measure from 60 to 80′ in the clear, and are from 12 to 80″ in diameter. Beebe, Lyon & Co's. mill has cut about 1,250,000′ of guijo.

All of the above timbers are too heavy to float and cannot be rafted except with lighter timber. They are, however, easily cut with the circular saw, when the man at the lever understands their peculiarities.

There are three classes of soft woods found on Basilan which are valuable in construction and cabinet work. They are:—

Calantas.—In logs usually from 14 to 16″ in diameter. This wood is of particular value as a cabinet and furniture wood, the perimeter of It is reddish in color and very similar in many ways to California redwood. Beebe, Lyon & Co.'s. mill has cut about 1,500,000′.

Lauan—Is noted for its beautiful grain. It resembles quite closely the American pine. Logs measure from 50 to 80′, and 12 to 70″ in diameter. There are three classes, distinguishable by their color—white, light red and dark red. This lumber is used in sidings and ceilings and in general construction. Beebe, Lyon & Co.'s mill has cut 500,000′.

LUMBER YARDS.—The first yard established by Beebe, Lyon & Co. was at Puerta Isabela, where a large supply is always on hand. About 2 yrs. ago, however, the company's business in Zamboanga increased to such an extent that it became necessary to establish a permanent yard there, where a supply of 200,000′ of all kinds and dimensions is kept on hand. The 300,000′ of hard timber, and draws 12′ 6″ when loaded. Captain Ellis is her master and is justly proud of his boat.

BOAT BUILDING.—The company has made some very successful experiments in boat building. The sloop *Helena* is their best effort She is 40′ long, 12′ beam and 5′ 6″ deep. She is sloop-rigged and has proved to be very fast. Unloaded she draws but 18″, and, with 7,000′ of hard timber aboard, only 4′ 6″.

In addition, the company has built 10 staunch surf boats which have found ready sale in the local market.

Beebe, Lyon & Co. are in the lumber and milling business to stay. They have worked hard and justly deserve the success they have attained. Dr. Beebe personally manages the Zamboanga office, and looks after the growing business of the firm abroad.

District of Davao

Magnificent Section of the Moro Province where Hemp is King and Cocoanut Crown Prince, and where the White Man is Playing an Important Part in Agricultural Development

The District of Davao is the land of promise for the white settler. Its broad fertile valleys have never known the spade or the hoe; nor its magnificent stretches of forests the axe of civilized man. Hitherto its broad, swift-flowing rivers have only served as waterways for the cascoes of a handful of wild and timid people who live in the mountain fastnesses, and only venture into the lowlands to fish and hunt. This magnificent district, with its 300,000 acres of choice agricultural land, its unlimited forest wealth, its grand stretches of cattle ranges, its undeveloped water power, and its unexplored mineral resources, is one of nature's grandest storehouses. It needs only American capital and lion-hearted American pioneers to make it one of the richest sections of Greater America.

Lieutenant Edward C. Bolton, *Governor af the Davao District*, and four of his interpreters; in front in white, Sr. Jose Bastida y Ramon *(Spaniard)*; rear row, reading from left to right, Sr. Ricardo Pelayo, *Secretary to the Governor*; Sr. Teodoro Palma Gil *(Visayan)*, and Sr. Angel Brioso

First and Only American Settlement in the Philippines.—Davao can lay claim to being the first and only American settlement in the Philippine Archipelago. Among the first American volunteer soldiers who were sent there in December, 1899, to raise Old Glory and declare American sovereignty along the shores of the gulf, was one man at least of the pioneer stock that reclaimed from jungle and savage the Great West. Captain J. L. Burchfield, who believes in the civilization of the American plow and sawmill, saw in Davao the promised land. Like his forefathers who carved the great State of Kentucky out of the wilderness a century before, he had the pluck and the energy to attack the jungles and savages of far-off Davao, and to make himself a home. He urged others to follow his example. They followed his advice. Success has crowned their efforts.

Today there are 35 American plantations scattered along the Gulf of Davao, from the Tagun River on the N. to the rock-bound Point Baños on the S., and three score hardy Americans are braving the jungle and hardships of pioneer life to delve out the agricultural and forest riches of the district. Incidentally they are carrying civilization into the mountain fastnesses of the savage tribes of Mindanao, teaching these simple people the use of the hoe and ax, and the value of industry. Thousands of these mountain people are now living in good houses, eating good food, and adapting civilized dress. They are laying aside their spears and kris, engaging in agriculture, and, in some cases, sending their children to school.

Hemp is King in Davao.—Hemp is king in Davao, and the cocoanut is crown prince. While there is a bright future for cacao, rubber, gutta percha, coffee, sugar, and other products, hemp and copra are the great staples. For some years prior to the entrance of American capital and enterprise, a few Filipino and Spanish planters in the district had hemp under cultivation. At that time the annual exports did not amount to more than 2,500 piculs (133 1/3 lbs. to the picul). In the old days the Spanish authorities did not give adequate protection, the mountain tribes were always at war among themselves, and commercial enterprise was not encouraged by the government.

Today, in the District of Davao alone, there are 3,500,000 hemp plants under cultivation, covering 10,000 acres of land. At the present time the monthly shipments amount to 2,500 piculs valued at ₱50,000, and it is estimated that in 18 mos. from date the shipments will have increased four fold.

The profits to planters are substantial. The soil is rich and the rainfall evenly distributed and plentiful, so that hemp is matured in from 18 to 20 os. from planting, afterwards yielding a continuous crop, under the present conditions of cultivation, for 16 yrs. Some planters estimate the profit in planting hemp as high as 40 per cent. If a practicable hemp-stripping machine is placed on the market the profit will be enormously increased, because, at the present time, the planter must share equally with the strippers the market price of the fiber he strips. Hemp is the only agricultural product known that costs half of its market value to harvest.

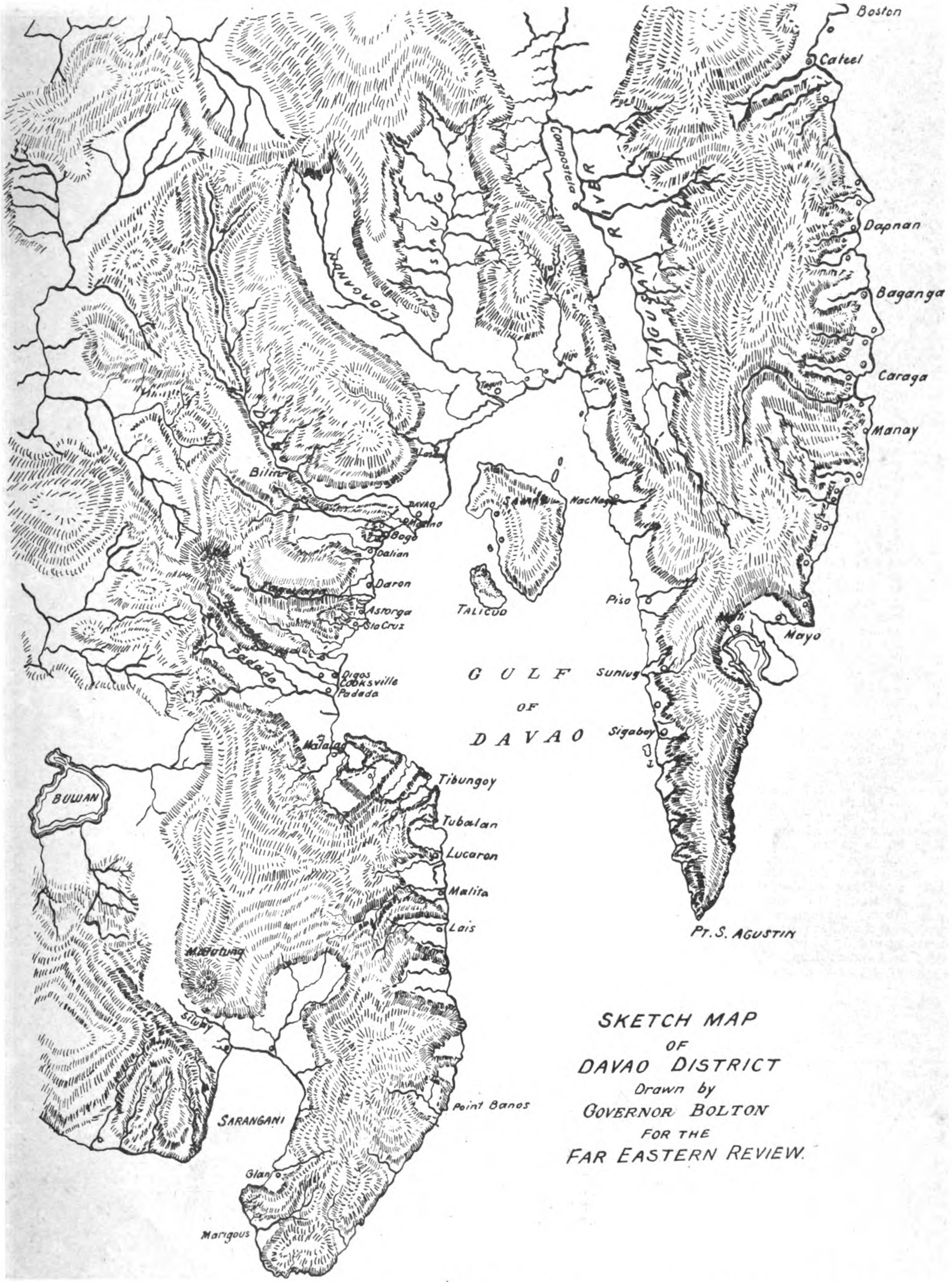
Copra Industry in Its Infancy.—The copra industry in the district is still practically in its infancy. There are some few groves of cocoanuts in bearing, and regular shipments of copra are being made. Since the American invasion, however, the acreage of cocoanuts has been enormously increased, and the productiveness of the trees will possibly be increased in like proportion, as modern scientific methods in planting and cultivation are being adopted. In this connection the writer saw a tree 10 yrs. old which had 240 nuts on it by actual count. This was, however, phenomenal. Planters are figuring on an average yield of 100 nuts per tree annually, and if they secure that the profits in the industry will be enormous. Government experts say that the copra from Davao contains a higher percentage of oil than that from any other districts in the Islands. The nuts are very large, too. Governor Bolton estimates that there are about 75,000 acres of first-class cocoanut land available for settlement in the District of Davao.

Many hemp planters in Davao are interplanting their hemp with cocoanut trees. The hemp plants are set out 9′ apart, and every fourth plant replaced with a young cocoanut. In the District of Davao it required about 7 yrs. for a cocoanut tree to come into full bearing. The planters calculate that by the time their hemp crops begin to deteriorate they will have full-bearing cocoanut groves, which will produce steadily through at least two generations of man.

Cacao was at one time king in a small way in Davao. Prior to 1896 a few Spanish and Filipino planters possessed orchards which yielded large returns; but during the insurrection of that year, many of these orchards were burned by the lawless element, and the remaining trees were destroyed by insects. The industry is being revived by the Americans, however, and many Spanish and native planters are following along. Modern methods of fighting the insect pests will be adopted, and it is hoped in 5 yrs.' time to again make cacao a staple of the district.

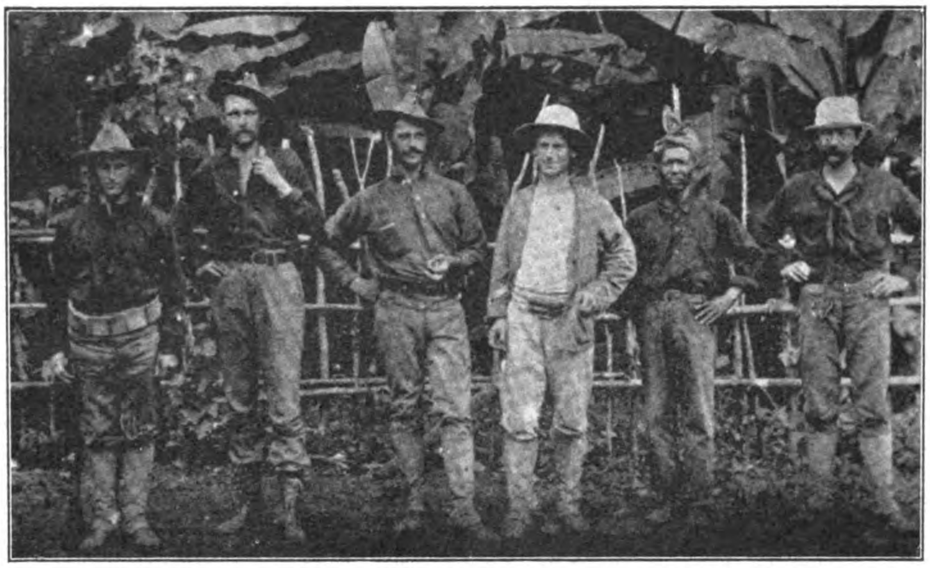
Timber Resources.—Very little has yet been done towards utilizing the extensive timber resources of the country. There are immense tracts of molave, ebony, ipil, and other famous hardwoods of Mindanao, in the district, and there is a tremendous quantity of undeveloped water power throughout Davao. To develop this particular source of wealth will require large capital, as well as energy and enterprise. An up-to-date sawmill is one of the things Davao most needs, and there is a grand opening there for a practical man with the necessary amount of capital.

Public Roads.—As yet the district is practically without roads. The old military trail



THE ABOVE MAP, which is merely an outline sketch made by Governor E. C. Bolton from his own field notes and sketches, shows in detail the lands in the Davao District available for agriculture. They are but a fraction of the total area, which is mountainous and heavily timbered.

The lands open to settlement are better watered, perhaps, than any in the archipelago. The great forest reserves about Mount Apo and along the entire coast give an assurance that the rain supply will always be generous and inexhaustible.



GOVERNOR BOLTON AND PARTY IN A FIELD OF 16-YEAR-OLD HEMP AT SANTA CRUZ

which leads along the coast from Davao S. to Sarangani Bay is available only for animals. The plantations established at the present time all are along the coast, or on navigable rivers, so that the planters have not as yet suffered materially from the lack of a highway. But a good wagon road will open up an immense area of new country, and facilitate business greatly. Estimate has been made of a road from the Pueblo of Davao to Santa Cruz, a distance of 30 ms., ranging from ₱3,000 to ₱8,000 per mile, not including bridges over the Davao and Siraon rivers, which alone would cost ₱100,000. The river beds are full of gravel, and there are immense heaps of broken coral rock along the beach that would be available for ballast. It is likely that the government will soon be in position to assist the district in this direction. The planters are all willing to give every assistance in their power to bring about the consummation of this improvement.

Problem of Labor.—The labor question has not up to the present time been of vital importance in the district, although it is one that will require careful study and handling in the future. The population of the wild tribes in the district is about 50,000. Formerly they all lived in the hills, where the bulk of them still remain. Since they are no longer at war, however, and have found the American able and willing to protect them against their old enemy, the slave-trader, they are frequenting the settlements along the coast more than in former years. They are docile, easy-going, and far more willing to work than their northern neighbors During the entire American occupation they have never committed any outrages against Americans in the districts. Isolated planters go among them unarmed and say that they rarely steal, pay their just debts, and have many virtues that their civilized neighbors might do well to imitate.

These wild people, as they are called, make the best laborers the planters have been able to obtain anywhere. Sunday is universally observed throughout the district, but aside from this there are many laborers among these wild people who work day in and day out through the year The bulk of them, however, must occasionally take a week or a month off to hunt in the mountains or trade with neighboring tribes. The planters have learned to deal very gently with these people. The first step towards securing their services as laborers is to build them a village in the plantation. Today very substantial villages are to be found at Cooksville on the Bulatakay River, and at the plantation of the Jolo Planting Company, on the Padada River. At the first-named place an average of 100 laborers per day can be turned out, and at the latter hacienda 50. The wage is 50c. Philippine currency *per diem.* This money all finds its way back into the plantation store, where the planter makes a handsome profit. If the planter chances to be a shrewd trader, he can buy forest products, such as beeswax and almaciga (mountain palay), and make a good profit by shipping it to the Pueblo of Davao or Zamboanga In some places the wild people refuse to accept cash as wages, preferring to take merchandise in exchange for their labor.

Labor May Be Imported.—The planters' association, an organization embracing the American and Spanish planters, is already preparing to import labor of the right sort. At the next meeting of the organization a commission will probably be appointed to investigate the matter and report. During the past 2 yrs. Japanese labor has been tried, but with poor results. The Japanese will only do the stripping, which pays best, and in addition are restless and often unreliable. Several batches of Visayan laborers from Cebu were also imported. They proved to be for the most part town people, unaccustomed to laboring in fields, lazy and discontented, and indifferent to the planters' interests as well as to their own. The plan now is to secure laborers from the agricultural districts of the N., and to offer them such inducements that they will become permanent settlers in the district. Major General Wood, as Governor of the Moro Province, gave his hearty support and coöperation to the efforts of the planters along these lines. Recently he offered his despatch boat *Sabah*, free of charge, to transport laborers to Davao from any part of the Philippine Islands.

Climate of Davao.—The climate of the District of Davao is delightful, despite the fact that the entire district is S. of the 8th parallel of latitude. There is practically no very hot season, while during the winter season it is always delightfully cool—for the Tropics. At all seasons the nights are cool and often cold. In January the writer often slept under double blankets while travelling through the district, and that at the sea level. The records show that it is a healthy place to live in as well. The planters are a fine looking, hardy lot of men, and most of them are out in the sun from early until late without feeling any evil effects. The following record of rainfall was kept by Dr. R. King Cole for the government:—

Greatest daily rainfall, 1904............137.6 mm.
Trimonthly rainfall, 1904..................206.0 "

May, 1904.. 228 mm. May, 1905.... 417 mm.
Aug. 1904.. 173 " Aug. 1905... 328 "

Total rainfall 1904...........................2475.8 mm.

Average daily temperature, at Davao, Mindanao, P. I. from November 1st, 1902, to October 31st 1903.

		6. A. M.	2. P. M.	6. P. M.	Av.
November	1902	74.3	86.8	82.6	81.2
December	"	73.6	84.5	81.4	79.8
January	1903	73.2	85.2	82.1	80.2
February	"	73.1	84.3	81.5	79.6
March	"	72.7	85.2	83.3	80.4
April	"	74.7	88.1	85.1	82.6
May	"	75.1	86.7	83.7	81.8
June	"	76.4	84.5	82.7	81.2
July	"	75.3	83.2	81.3	79.9
August	"	74.6	83.8	82.0	79.9
September	"	74.7	83.6	82.1	80.1
October	"	75.2	84.4	83.5	81.0
General average		74.4	85.	82.5	80.6

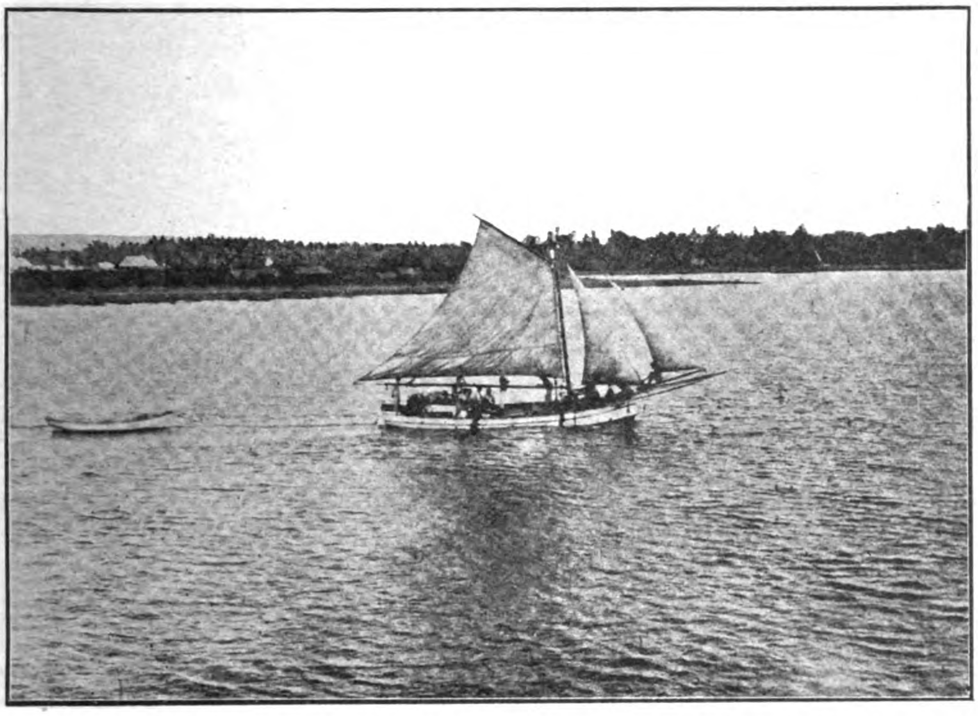
Maximum temperature of the year	92°	April 19th, 1903
Minimum temperature of the year	71°	Dec. 13th 1902
Greatest daily range	15°	On several dates
Least daily range	4°	May 18th, 1903

Average daily temperature from November 1st 1903, to October 31st, 1904, inclusive.

		6. A. M.	2. P. M.	6. P. M.	Av.
November	1903	75.2	84.3	82.5	80.6
December	"	74.4	83.5	81.2	79.7
January	1904	73.7	83.5	80.3	79.2
February	"	74.0	83.5	81.9	79.8
March	"	73.2	84.0	81.0	79.4
April	"	74.8	85.2	81.7	80.6
May	"	75.3	84.6	82.4	80.8
June	"	75.4	83.8	82.1	80.4
July	"	74.6	84.6	83.6	80.9
August	"	75.0	84.4	82.0	80.6
September	"	75.3	84.7	82.8	80.9
October	"	75.0	85.6	82.9	81.2
General average,		74.6	84.3	82.0	80.3

Maximum temperature for the year,	89°	Oct. 18th and Oct. 23rd, 1904.
Minimum temperature for the year	70°	March 9th, 1904.
Greatest daily range	14°	March 16th and Oct. 23rd, 1904.
Least daily range	2°	Dec. 15th 1903, and Jan. 2nd, 1904.

DISTRICT GOVERNOR'S HOME AT DAVAO; A PLANTER'S DWELLING OF THE BUNGALOW TYPE



HARBOR OF DAVAO, WITH SENOR BUNGOY'S SLOOP *GLORIA* IN THE FOREGROUND

DAVAO DISTRICT DESCRIBED

(By Governor Bolton)

The District of Davao is called by its white settlers the white man's Paradise of the Philippines. It is the most easterly of the five districts composing the Moro Province, and the most southerly of the four mainland districts, its S. extremity being 100 ms. S. of the N. coast of Borneo, extending 5 deg. 20 min. to 8 deg. N. L., and from 131 deg. 27 min. to 132 deg. 38 min. W. S. Its greatest width is 72 and its greatest length 160 ms.

Topography and Habitation.—The Gulf of Davao is a deep indentation in the S. almost dividing the district, the head of the gulf being only 42 ms. S. of the N. boundary. The gulf is 37 ms. wide by 87 ms. long.

There are five great mountain chains in the district, one in the E., one in the N., and three to the W. These mountains, together with the gulf, divided the district into five natural divisions, convenient for descriptions.

The East Coast.—Beginning at the E., the first division will be called "The East Coast." This is a narrow watershed bordering the Pacific Ocean throughout its length, extending from San Agustin Point to 8 deg. N. L., a distance of 105 ms. The first 30 ms. of this coastline N. from San Agustin is mountainous and rockbound; beyond that point the mountain-slopes approach and recede from the coast irregularly forming numerous wide recesses or narrow valleys.

Pujada Bay, 30 ms. N. of San Agustin Point, is the only harbor. It is nearly circular in shape and about 12 ms. in diameter, forming a perfect anchorage and protection for all classesof ships. The town of Mati, situated at the head of the bay, is one of the five municipalities of the district, and a shipping point for *almaciga*, cattle, and hemp in small quantities. There is ample level land in this locality but little of it is suitable for hemp. It is an ideal country, however, for cattle grazing, cocoanuts and sugar cane. The rainfall is light, streams are plentiful, and the climate healthy. There are 9,000 head of cattle at Mati, and a number of small hemp and cocoanut plantations.

Mayo Bay lies to the N., separated from Pujada Bay by a narrow tongue of land. There are several suitable locations for hemp open and available here.

Caraga, the next municipality, lies 30 ms. N. of Mati. There are several thousand acres of land suitable for cattle grazing and cocoanut growing, but practically no hemp land. This particular locality is subject to droughts.

Baganga, the third municipality, lies 20 ms. N. of Caraga. Here there are several thousand acres of available hemp land lying in river valleys and a number of small plantations of from 5,000 to 15,000 hills that could probably be bought from the natives. There is one American plantation at Baganga managed by Mr. Christian Ade in which three other Americans are interested, each paying a small monthly installment. The plantation is in a prosperous condition and contains some 40,000 hills.

There is a considerable amount of beach land in this locality suitable for cocoanuts.

Cateel, the fourth municipality, lies 20 ms. N. of Baganga, at the mouth of the Cateel River, the largest stream on the E. coast. The river valley is narrow but deep, and there is land between the coast and the mountains and also around the Village of Boston, 6 ms. N. There is a small amount of good hemp land in this region, although the greater part of it is better adapted to the cultivation of cocoanuts, cacao, and rice. The inhabitants of this first division are friendly and tractable. The coast people are of Visayan origin or christianized Mandayas. The mountain folk are called Mandayas or Mansacas. They are numerous, but wild and timid. Mayo Bay contains a small settlement of Moros, the only one on the Pacific Coast.

The only forest products shipped out are almaciga and beeswax, at Mati. A serious drawback to this region is its comparative isolation from outside world, from November 1st to April 1st of each year, owing to prevailing storms.

The S. half of the coast also has less rainfall and is more subject to protracted droughts than the upper of N. half. Labor is very cheap, ₱0.25 per day being the established wage. There are ample men of the working class, but the people as a whole are lazy and shiftless. The fault can be removed to a great degree, no doubt, by fair treatment and patience as the inhabitants are exceptionally tractable.

The Cateel River at any point above 12 ms. from its mouth would furnish ample water power for any project. Tarragona Creek and Baganga and Caraga rivers would all furnish power for sawmills or similar industries, within 4 ms. of their mouths. The mountain slopes facing this entire coast is forest-covered, containing a great supply of the hard woods of the various groups.

Second Division.—The second division is the Upper Agusan Valley. This great valley is drained by the Agusan River and six large tributaries. It is from 6 to 15 ms. wide and extends from the 7th deg. N. latitude to the 8th or N. boundary of the district; thence it debouches into a great plain in N. Surigao. This great valley defies a brief description or even a rough estimate of its agricultural value owing to the diversified character of the terrain and soil, and on account of the great forests covering it. It is a low flatiron-shaped plateau tilted up at the S. or toe end and extending far inside of the S. watersheds. Through its center flows the Agusan (Butuan) River whose course is at right angles with numerous rivers flowing into the ocean and gulf up the Mati Peninsula. There it flows parallel with and in an opposite direction to the Tagun River at a distance varying from 30 to 8 ms. There is an immense amount of fine hemp, rubber and pine lands available. Hard woods, almaciga, beeswax, rattan, and other forest products are abundant. The land is practically level and forest-covered. In general the clearing of this land would be easy though in some localities heavy. The Agusan River is navigable for boats of 4′ draft for 55 ms. up from the N boundary of the district (8 deg.). Water power is abundant and distributed. There is a population of several thousand Mandayans in the valley, and as many more in the N. slopes on either side. They are gentle and tractable and of good physique, but not accustomed to work. They will quickly settle around an American plantation in large numbers for protection against slave raiders, tribal quarrels, etc. Communication with the Gulf of Davao could readily be opened by cutting a road across from Compostela to the forks of the Tagun, a distance of about 22 ms. A pack trail connecting these two points has been frequently recommended by Governor Bolton, and is now under consideration by the Legislative Council at Zamboanga. Communication by way of the mouth of the Agusan is laborious and tedious, an empty banca taking five days to go from Compostela to Butuan, and eight days to return. A settler going under present conditions to the Upper Agusan Valley (Compostela) would have great difficulty in transporting his effects and would virtually be cut off from the outside world except at rare intervals. A trail or a road can be put through this region within one day's travel of the Americans on the Tagun at the head of steam navigation on the Tagun River.

Third Division.—The third division is the Gulf of Davao region. The gulf drains a basin 58 ms. in width by 65 ms. in length. The watershed on the E. is from 6 to 20 ms. in depth, on the N. 37 ms., and on the W. from 40 to 6 ms. South of the mouth of the gulf (Point Baños) the W. shore line extends to Point Sarangani, 25 ms. in a straight line. The watershed along this portion of the coast averages 15 ms. The principal rivers and streams draining this basin are, on the E. the Sumlug and Piso, on the N. the Hijo, Tagun, Tuganay, Lasang, and Davao, and on the W. the Matina, Talomo, Lipadas, Siraoan, Quinucul, Tagulaya, Balutacay, Padada, Tibungoy, Lais, and Nuin rivers. The S. half of the E. shore of the gulf, from point San Agustin to Coabo, is subject to droughts and has light rainfall, and it is suited for the cultivation of cocoanuts. The forest product is almaciga. The inhabitants are Visayans and Manobo Christians. From Coabo N. there are tens of thousands of good hemp and cocoanut land along the Sumlug, Piso, Magnaga, Matiao, and Copiat creeks. Almaciga, hard woods, beeswax, and rattan are found in large quantities. The inhabitants are Moros on the coast and Mandayans inland. These tribes are friendly and peaceable, the only people that have ever caused any trouble in that region being the Managusans, living at the headwaters of the Agusan River across the mountain chain.

Fourth Division.—This division lies on the N. shore of the gulf and includes the Hijo Valley to the Davao Valley, and the bottom lands of the Tuganay, Lasang, Libaganun, and Madaun rivers. The last two named are practically salt sloughs and the land surrounding them is particularly favorable for cocoanuts. The other rivers named are large, fresh water streams flowing through fine hemp country.

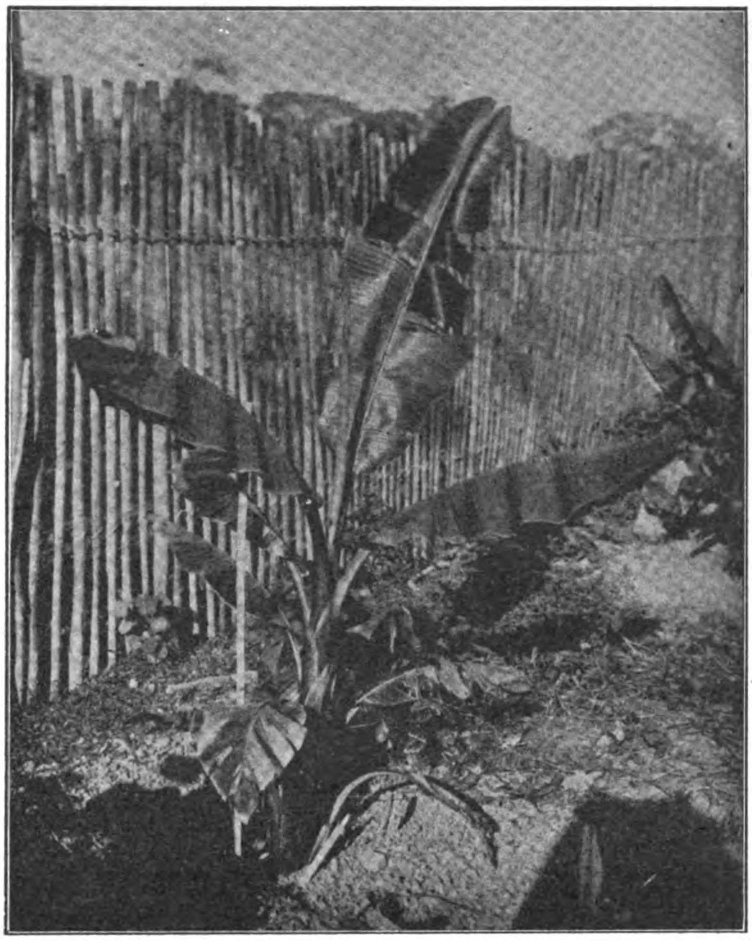


Photo by Dr. Merton L. Miller

ABACA PLANT 6 MOS. AFTER PLANTING, PLANTATION OF THE MINDANAO ESTATES COMPANY, PADADA RIVER VALLEY

The Tagun is the deepest river in the division and is navigable for boats drawing 8′ for 10 ms., and for boats drawing 2½′ for 22 ms. At this point is the junction of the Saug and Libaganun rivers (Two Libaganun Rivers), each draining fertile valleys below this fork. The Tagun does not flow through a valley proper but through a great wooded plain extending from the Agusan Divide to the Davao Divide, and towards its mouth the land adjacent to the river is swampy. The soil in this river system is suitable for hemp, cacao, and rubber, but not for cocoanuts. Forest products such as palma brava, nipa, wax, hardwoods, and rattan, are abundant, although there is no almaciga. Along the shore are Moro settlements (13 all told) organized into a ward with officials, police, etc. The interior people are of the Mandayan Tribe, all friendly, tractable, and fairly good workers.

The Tagun River is subject to frequent high floods from June to December of each year, but does not overflow. It is difficult to ascend at times owing to the floating trees. On the other hand this region appears to have a more evenly distributed and heavier rainfall than other parts of the district.

The Hijo and Lasang rivers are navigable for small boats for 1 m. above the mouth. They have a swift current and are subject to frequent raises which do not overflow the banks. There are several thousand acres of good hemp land along each of these rivers, and they could furnish power for mills or tramways. Hard woods, wax, and rattan are the ordinary forest products. The inhabitants are the same as given for the Tagun.

The Tuganay is a tide-water river for 14 ms., and is very swampy up to that point. From there up for 12 ms. the land is fertile and suitable for hemp and similar crops. On the upper waters is found fine timber. The water power is very limited. From Lasang to Davao the beach land is spoiled by a narrow swamp lying 100 yds. or less from the beach. There are only a few limited tracts here suitable for hemp and cocoanuts. There is some valuable timber along this coast. Samal Island, lying opposite the land just described, a distance of ¾ m., contains a great quantity of molave and other valuable timber, also several thousand acres of grazing land. The soil is too shallow for hemp, while cocoanuts thrive along the shore. The inhabitants are Dinagats (erroneously called Samales), about 1,000 in number. They are good workers and the most docile of the gulf tribes.

The Davao River bottom lands are entirely taken up by Filipino hemp plantations for 12 ms. of its course. There are fertile forest-covered uplands E. of the river, but no convenient communication either to the river or the coast. In the vicinity of the Pueblo of Davao, near, the river's mouth, there are several thousand acres of grass land suitable for grazing and about 1,000 acres of sugar cane.

The W. shore of the gulf, from Davao to Astorga, 22 ms. S., is dotted with Visayan villages, and the land adjacent to the sea is taken up by hemp and cocoanut planters. Inside of this fringe of settlements and plantations, from Davao to Siraoan, there are not less than 30,000 acres of good hemp land, forest-covered, containing small scattered settlements of Bagobos, Atas, and Guiangas, all friendly, tractable, and organized into wards. This region is in the shape of a parallelogram about 10 ms. N. and S. by 7 ms. E. and W., bounded on the N. by the Talomo River, on the E. by the same river, on the S by the Gulf of Davao, and on the Apo Range of mountains.

Beyond the Talomo River the country is still level and fertile, but the Talomo and Tumungan Tuli and other rivers beyond the described limits flow through deep cañons ranging from 600′ to 800′ in depth.

There are numerous fine water courses throughout this region capable of furnishing power for any practicable project. Labor is not sufficient to cultivate any great percentage of this tract, and would have to be imported for large or numerous plantations. Much of the forest timber is available and the rubber appears to be of a very fair quality. Rubber trees are said to be abundant.

Beyond Daliaon this basin rapidly narrows until at Astorga the mountains slope practically to the sea. At a point 29 ms. from Davao the mountains recede again forming a small semicircular basin around Santa Cruz. The land about here is cut up by numerous small and large plantations, but from about 4 ms. S. of the former there are 2,000 or 3,000 acres of fertile forest land in a narrow strip between the hills and the gulf.

At Digos, 45 ms. S. of Davao by road and 28 ms. by sea, the spur of hills lying S. from Santa Cruz disappears, leaving an open coastline S. as far as Malalag. This is the opening of the Padada River basin which extends W. and NW. to the Davao-Cotabato Divide, N. to Mount Apo, and S. to the beginning of the Malalag Hills at Mount Uptaloo. Through the center of this basin flows the Padada River, a shallow swift stream subject to high floods, rising between the Apo and Matulung ranges. The basin is also drained by the Balutacay River, rising in Apo Volcano. There is a great deal of valuable hemp land on either side of this river, a number of grass fields, and considerable swampy country. The river is not navigable for boats of any kind beyond the last few miles, but loaded rafts can be sent down from 40 ms. inland. The land is level and trails fair, but transportation for stores and effects of all kinds is difficult owing to the swiftness and shallowness of the river, and the absence of roads. The land within this basin is so diversified that it may be said to be suitable for almost any tropical agricultural project. The Padada River has several large tributaries and at any point of its course could afford power for any project.

The forest products are beeswax and timber. The superior groups of timber are nowhere found convenient along the lower course of the river, but the upper stretches near the divide hold valuable forests. The inhabitants of this region are Calagans and Tagacaolos near the coast, and Bagobos and Bilans in the interior. The coast people are all organized and partially civilized; the interior people are friendly but wild and timid and suspicious of strangers. They recognize the authority of the district officials but are governed by their own chiefs and laws. There is a great deal of available material for labor in the interior of this region.

From Malalag S. to Point Baños the available land is contained in small basins or recesses of from 2,000 to 3,000 each. This is nearly all good hemp land, and there is a great deal of fine cocoanut land along the beach. There is almaciga, biaonut, beeswax, rattan, and hard woods along the coast, but it is not utilized. The Mälita and Lais rivers could furnish power for small mills. There is available open land for settlers at Malalag, Tibungoy, Talagutun, Cabitougan, Lauwa, Lapuan, Calian, Linadesan and Culaman.

Beyond Point Baños to Point Sarangani there is no good fertile land in tracts large enough for a plantation. There is a great supply of almaciga and biao nut, and in Spanish times there was a flourishing trade in those articles at Magulibas and Nuin. Opposite, 6 ms. S. of Nuin, lie the Sarangani Islands containing about 20 and 12 sq. ms. respectively. The larger has considerable pasture and cocoanut land and timber. It is mountainous in the N., W., and center. The smaller island is forest-covered but much lower than the other and contains rubber and rattan. This island also has two fine harbors for small steamers. All steamers *en route* to and from Davao pass through the channel between these islands and the mainland.

Fifth Division.—West of the Malalag Range of mountains which form the W. boundary of the fifth division (Sarangani) and N. of Sarangani Bay, lies a grassy plain gently sloping

toward the bay forming the basin of the Boayan River. This plain is the finest pasture land in the district. It is 22 ms. in length by 6 ms. in breadth, is well watered, and is dotted with clumps or belts of timber. Sarangani has a good deal of fine cocoanut land and some valuable timber forests along its E. shore. The coast inhabitants are Moros (4,000), the interior people are Bilans. They are friendly and tractable.

Available Lands in Davao.—It is estimated that there are in the District of Davao 150,000 acres of available or comparatively accessible hemp lands, possibly 75,000 acres of cocoanut land, and undetermined but large tracts of valuable forest lands; and including all the country S. of Sarangani Bay 100,000 acres of pasture land. As the country becomes filled up good roads will open the now inaccessible lands to cultivation. Water power is so fairly distributed throughout the district and large swift moving streams so numerous that it is unnecessary to describe them in detail.

Forest products of district are almaciga, biaonut, rattan, beeswax, hard woods, ornamental woods, tangal bark, cinnamon bark, and rubber. Some of these articles have been partially exploited, others not at all.

The climate is healthy and the temperature moderate and even. Rainfall is heavy but fairly distributed throughout the year except from February 1st to May 1st, during which period the showers are light and infrequent making it practicable to clear off the land and burn the fallen timber and brush.

Inhabitants and Labor.—The inhabitants of this district are, roughly:—

Visayans	7000
Moros	1600
Europeans and Americans (aside from officials)	72
Chinese and Japanese	200
Non-Christian Tribes	4200

The people are friendly throughout the district, easily managed, and as a rule when handled patiently and justly satisfactory laborers when they work. Their greatest drawback is their dislike of steady employment and fondness for rambling off into the hills, for a week or a month. Another stumbling block for a new comer is their demand for pay in advance. If these people are treated as children, allowances made for their old customs and superstitions—in other words, if the planter can get in a manner in sympathy with them they will probably always continue to aggravate, but on the whole will prove as satisfactory unskilled labor as can be procured anywhere. On two adjoining plantations one planter may have ample and satisfactory labor; the other may have few and find them worthless to him. None of the imported Japanese or Filipino labor has proven satisfactory so far. It is probable that if Filipino families from strictly agricultural districts were imported they would be far superior to the low class of Japanese and Visayans from seaport towns.

The Government of the Moro Province has offered to transport Visayan laborers from the northern islands to Davao, free of cost to planters, and steps are now being taken to enable the planters to avail themselves of this office to the best advantage.

A labor commission consisting of three town councilmen and three citizens has been appointed to investigate fully and report upon the labor problem of the gulf. They meet each Saturday afternoon inviting the planters and laboring class to appear before them and also visit plantations.

Capital Required to Open up and Carry on a Plantation Until it is on a Profitable Basis.—The amount required is of course dependent on many things such as location with reference to the water or land communication, seed, labor supply, rainfall, irrigation, forest (heavy or light clearing, soft or hard woods) fencing against wild hogs, management, manner of living.

1ST YR.'S EXPENSES

Cost of residence 40 sq. ft. (native style.)	₱	500
" " food 1 yr.		600
" " cook 1 yr.		180
" " boy 1 yr.		180
" " house and cooking utensils		250
" " sail boat		350
" " " " crew used 60 days per year		200
" " clearing 50 acres average wood land		1000
" " fencing 50 " " " "		500
" " 25000 hemp seed		750
" " transporting 25,000 hemp seed in gulf		200
" " handling 25,000 hemp seed prior to planting		30
" " carabao and cart		140
" " planting 25,000 hemp seed		300
" " " 50 acres of camote		75
" " caring for 25,000 hemp plants		800
" " agricultural hand tools		200
" " agricultural cultivating tools		100
" " aiding natives to build houses		350
" " Incidentals		300
	₱	7005

2D YR.'S EXPENSES.

Cost of household	₱	960
" " repairs to boat house and fences		300
" " crew 60 days per year		200
" " caring for 25,000 hemp plants (1st yr.'s planting)		375
" " clearing 50 acres of woodland		1000
" " fencing 50 " " " "		500
" " 25,000 hemp seed		750
" " transporting 25,000 hemp seed		200
" " handling 25,000 " "		30
" " planting 25,000 hemp seed		300
" " " 50 acres in camotes		75
" " caring for 50,000 new hemp 1 yr.		1200
" " tools		150
" " store house		1000
" " aiding natives to build houses		350
" " 2 native foremen 1 yr.		720
" " Incidentals		300
	₱	8410

3D. YR.'S EXPENSES.

Cost of household	₱	960
" " repairs to boat houses and fences		300
" " crew 60 days per year		200
" " caring for 50,000 hemp over 1 yr. old		800
" " clearing 100 acres of wood land		2000
" " fencing 100 " " " "		1000
" " handling 50,000 hemp seed prior to planting		60
" " planting 50,000 hemp seed		600
" " " 50 acres with camotes		150
" " caring for 50,000 hemp for 1 yr.		1250
" " tools		400
" " houses for native laborers		350
" " 4 plough animals, bulls		400
" " 2 carabaos		150
" " 2 ponies		120
" " animal and tools shed		200
" " incidentals		2000
" " pulling 225 piculs of hemp		2025
" " pay of three native foremen 1 yr.		1080
	₱	14,045

Received for sale of 225 piculs of hemp	₱	4725
Grand total of expenses for 3 yrs. ₱ 29400		
Original capital invested ₱ 24675		
Total expenditures during during 4th yr., no new planting	₱	10405
Total receipts during 4th yr.		12285
Clear profit of 4th yr.	₱	1880
Total expenditures during 5th., yr. no planting	₱	11640
Total receipts during 5th yr.		16800
Clear profit of 5th yr.	₱	5160
Total expenditures during 6th yr.	₱	15900
" receipts " 6th yr.		27300
Clear profit of 6th yr.	₱	11400
Grand total expenses for 6 yrs.	₱	67345
" " receipts " 6 yrs.		61110
Balance of the original capital still invested	₱	6235

The above estimate is believed by Governor Bolton to be conservative and absolutely within the limits of safety. Allowance has been made for the every-day set backs of the average plantation. The total expenditures may be greatly reduced if the planter should purchase a small producing plantation of say 5,000 hills for seed and do his clearing, fencing, etc., by contract. If he should run a store in connection with his range, the profit on articles sold range from 20 to 100 per cent. This has not been considered in the estimate as they are uncertain elements dependent on location, management, and policy.

A plantation economically managed and favorably located should return the original outlay at the expiration of the 5th yr. and give 40 per cent on all original capital invested for 7 yrs. After the 12th yr. the hemp will yield less and less and require replanting about the 15th yr.

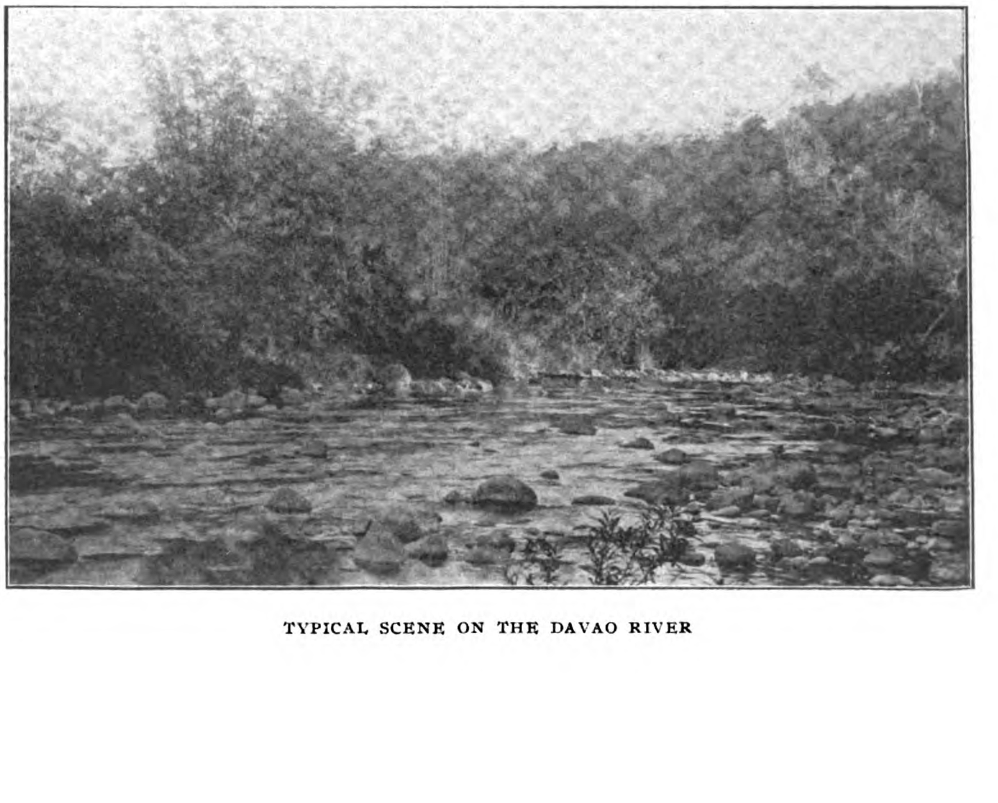
The yield calculated per 1,000 hills will yield as high as 18 or 20 piculs per year under the most favorable conditions.

Great care must be exercised as to the variety of hemp planted. Magindanaw, Bungolangon, Tangongun, and Libatun are the favorite varieties here. Each has its own peculiar advantage. Bagisanun and Putian are to be avoided for economic reasons.

GOVERNMENT OF DAVAO

To Governor E. C. Bolton, who is the first civil governor of the District of Davao, belongs no small part of the credit for the peaceful conditions existing there, and the general feeling of security that prevails among the American planters. Governor Bolton is a 1st lieutenant of the Seventeenth United States Infantry. He served with great gallantry under Generals Bell and "Jake" Smith in Luzon in 1900 and 1901, and was recommended for a brevet. When his regiment went to Mindanao he was given command of the Subdistrict of Sarangani Bay, where he remained from October 20th, 1901, to May 31st, 1902. It was then that he commenced exploring and mapping the District of Davao. When he was made post commander at Davao in August, 1903, he continued the work with great zeal.

When the civil government was established in October, 1903, Lieutenant Bolton was appointed governor. At that time there were few Americans in the district, outside of the army Captain Burchfield and Peter Harding



TYPICAL SCENE ON THE DAVAO RIVER

THE SULTAN OF DAVAO

were the only American planters. The task which confronted Governor Bolton was to establish peace among the mountain tribes. who had been at war with each other for generations. In order to do this he had to seek out the head chiefs of a dozen or more tribes, impress upon them the power and good intentions of the American Government, arbitrate their tribal differences, and bring them under the civilizing influences of a beneficent government. It took time, patience, and courage to accomplish this. Governor Bolton found he could do more by going among them practically alone than by moving about with a military escort. He took many chances and had many narrow escapes before the people came to know him and believe in his good intentions. Now he can go all over the district alone and unarmed, and is a welcome guest everywhere.

On December 21st, 1903, the chiefs and headmen of all the warring tribes met by appointment at Santa Cruz, about 30 ms. of Davao, where umpires were appointed and all their quarrels and grievances aired and settled according to their tribal customs, Governor Bolton acting as judge. The fines were all paid on the spot, the warring chiefs shook hands, and have ever since kept the treaty there made, acknowledging the sovereignty of the United States.

Governor Bolton has explored every nook and corner of the Davao District, and has mapped it as well. His detailed report, printed in another column, of the physical conditions of the country, the whereabouts of available land, and the cost of planting hemp, etc., is the result of his personal observations, and, for that reason, the data and statements therein contained are more valuable than any that otherwise could be obtained.

Ever since he has been in control of the district Governor Bolton has handled a great volume of correspondence from people who want to settle in that territory. In his replies to these inquiries he has been very painstaking. His home is always open to visitors in the district, and he has made every effort to promote the interests of the planters and the other people under his jurisdiction. Governor Bolton is himself interested in the Culuman Plantation, located at Malite.

Governor Bolton is only 34 yrs. old. He comes from New York, began his military career as a private in the ranks, and won his shoulder-straps by hard work and faithful service.

Orville V. Wood.—Orville V. Wood, district secretary of Davao, planter, and one of the moving spirits in the Davao Planters' Association, is a bright young Californian who has made his mark in the district. He was appointed from Los Angeles to a position in the educational department of the Philippine Government in 1902, and soon after his arrival here was sent to Davao to take charge of a school at Santa Cruz, near the headquarters of the Bogobo Tribe, mountain people, who seemed more tractable than their neighbors. Mr. Wood at once proceeded to master the dialect of the Bogobos, and at the same time became conversant with the Spanish language.

So great was his success with bringing the Bogobos into touch with civilization that he attracted the attention of Major General Wood, who appointed him secretary of the district. It is believed that still higher honors await him. Not only did Mr. Wood succeed in teaching the young Bogobo idea to shoot, but he initiated his elders into the art of cultivating the soil. He induced them to leave the mountains and settle along the beach. Today there is a large settlement on either side of Santa Cruz, and the Bogobos have under cultivation around the town not less than 100,000 hemp plants. The writer passed a house by the roadside, near Santa Cruz, which was a mere shelter; yet there sat a Bogobo woman using an American sewing machine.

Mr. Wood is interested in two plantations. As early as 1903 he secured 200 *hectares* of land about 2 ms. S. of Santa Cruz, between the Tuban and Tagabuli rivers, and set out 12,000 plants from which he is now stripping. Since that time he has set out 12,000 more plants that have not yet come to bearing. This plantation, like some others in the immediate vicinity suffered considerably from drought. Mr. Wood proposes to irrigate, however, and can do so owing to his fortunate location, at small expense. There are practically no weeds on the place, so that the expense of clearing the growing hemp is very light.

ORVILLE V. WOOD,
Secretary Davao District and Hemp Planter.

On the upper end of his plantation, which is high ground Mr. Wood is preparing to plant 3,000 cacao trees. He believes that with proper attention they will yield him splendid returns. All of the laborers on his place are Bogobos. He finds them honest and faithful, and excellent workers.

Mr. Wood is one of the six stockholders in the Culuman Plantation at Malite. He is one of the leading spirits of the country, an energetic government official, and one of the most popular men in the district.

DAVAO PLANTERS' ASSOCIATION

On February 15th, 1905, at Santa Cruz, some 15 American and Spanish planters of the District of Davao met and organized themselves into the Davao Planters' Association. The aim and purpose of the association is stated in the constitution to be "the consideration and regulation of questions affecting the interests of the planters of the District of Davao." The officers elected at the initial meeting have been returned to office for the year 1906—Mr. F. C. Cook as president and Mr. Max. L. McCullough as secretary and treasurer. Regular meetings are held every 3 mos. in Davao, and are so conducted that they add to the social and intellectual as well as to the material side of life. The association has gained a membership from 17 to 32, and is now thinking of increasing its membership by admitting a number of the progressive native Filipino planters of the district. The association subscribes to and keeps on file several of the leading publications of the Orient, and has a circulating library of some 75 volumes for the use of members. It endeavors to keep abreast of the times and well posted in the knowledge of tropical agriculture as it has been worked out in the older and more advanced colonies of Ceylon, the Federated Malay States, and the Straits Settlements The association is today a well-organized body devoted to the advancement of the material interests and progress of its members and of the district. Its work so far has been done harmoniously and with some degree of success As to its members, the association offers a means of becoming better acquainted with the men and the methods employed, provides for coöperation in matter of plantation work, and interests itself in the collection and tabulation of agricultural statistics drawn from monthly and annual reports. Already coöperation has benefited members in such matters as tools, labor, seeds, and transportation To new men entering the district the association offers assistance in traveling over the country and in selecting proper locations, and affords practical information along all lines of agricultural activity. The distant inquirer and prospective investor finds the association a useful means of obtaining information on existing conditions and the prospects of individual investment. Men lacking in sufficient capital and others needing a competent foreman or manager for their prospective places may be brought into touch through correspondence with the secretary-treasurer. The association has taken the lead in the matter of the introduction of new crops into the district, such as rubber and maguey, as well as the exploitation of its jungle produce and the resuscitation of the once lucrative culture of cacao.

At each quarterly meeting papers are read on questions of general interest, and followed by short discussions and comments. At the last meeting a paper was read calling attention to the work that might be taken up in the future, touching on such points as regulations for the marketing of products and the furnishing of supplies to plantations, local transportation, and the standard of quality of all goods exported. The association early declared itself in favor of more liberal land laws for the district and a policy on the part of the government of attracting American settlers and the encourage-

FOUNDERS OF THE DAVAO PLANTERS' ASSOCIATION

ment of American capital. Its aim is, while strictly keeping out of politics, to make such recommendations to the governing authorities as seem called for by existing conditions and the desire to confer the most benefits on all concerned. The association stands for that spirit of enterprise and progress found among those hardy pioneers who built up the Great West of the United States. It enrolls among its members men whose enterprise, vim, sanity, level-headedness, and optimism are such as to class them with those superior pioneers who settled and transformed the older and less distant frontiers of America. The association has faith in the government, both insular and provincial, and in the principles it stands for, and looks forward in the future to the development of the District of Davao and the spread of the principles of Americanism in the Orient. Following is a list of plantations and managers that come under the direct influences of the association:—

Lais Trading and Development Co.	Lais	H. S. Peabody.
Culamen	Malita	R. K. Cole. BenjaminChristian.
Davao Trading and Development Co.	Kibulan,	J. N. Carrigan (on leave). J. N. Roscom (F.)
Pioneer Malalag	Malalag	J. T. Byrne. Thos.Kelly.
Paul, Nieman & Co.	Malalag	Beuj. Paul C. L. Nieman.
Reid, Cochran & Co.	Malalag	Mr. Reid.
Mindanao Estates Company	Padada	J. H. Shipley J. E. Shubert
Jolo Planting Company	Maxville	A. C. McClellen.
Balutakay Hemp Plantation Company	Balutakay	J. P. Skinner.
American Agricultural and Commercial Company.	Cooksville	O. B. Watkins.
Digas Estate	Digas	Mr. Sawyer.
Keller & Gohn Company	Santa Cruz	F. L. Keller. W. H. Gohn
Wilson Plantation Company	Lacaron	C. D. Wilson.
O. V. Wood	Santa Cruz	O. V. Wood.
Vandermerion & Co.	Santa Cruz	V. Vandermerion
Luis Sorroche	Astorga	Luis Sorroche
Tagulaya	Tagulaya	Juan B. Urquiza.
Fernando Navarro	Daron	Fernando Navarro.
Quinucul Trinidad	Daron	Manuel Sanches.
Dos Hermanos Hacienda Paz	Daron	Gregorio Palacios.
Kentucky Ranch	Daliao	J. L. Burchfield
Hacienda Fiel	Dumuy	José Bastida y Ramón.
Belen	Davao	Juan Auad.
Tagun Plantation Company	Tagun	George Sickles.
American Plantation Company	Tagun	Mr. Harper.
I. H. Rogers	Mattiao	I. H. Rogers.
Piso Coconut Plantation	Piso	Peter Harding.

LIVESTOCK GROWING

Stock raising ought to be one of the staple industries of the Davao District. And it is to some extent. There they have thousands of acres of the finest range land conceivable—long, rich grass upon which cattle grow fat and multiply—and never have they had, in the history of the district, any infection among their herds.

Matute Bros.' Ranch.—Just S. of the Tagalaya River, about 20 mins. ride, there is a range of cattle land stretching away into the foot-hills, that is about as nearly ideal as human mind could conceive. It is the property of Messrs. Matute Bros., an old and wealthy Spanish firm. The range contains nearly 5,000 acres of land. Several small mountain streams flow through it, and they are bordered by thickets of trees where the cattle lie in the heat of the day. The pasturage is plentiful and of the finest quality for fattening beeves for the market.

On the Matute Range there are about 1,200 cattle today. The herd was started only a few years ago. It is a revelation to ride across the ranch and see the great, sleek cattle. They are of the shorthorn, humpback, Indian breed, and furnish most excellent beef which is worth 10 cents per lb. in Davao. By marketing the fat young steers alone such a herd would yield a handsome profit, provided the market could be brought close. Much of the range is enclosed in wire fence.

Felice Mandel's Range.—About 2 ms. from Davao, S. of the river, there is another beautiful range where Señor Felice Mandel, a Spaniard, has a fine herd of cattle, numbering about 150 head. He bought the herd 1 yr. ago. It numbered then 125 head, and he paid an average price of ₱26.90 per head. Since he has owned the herd he has marketed enough to make a good living, built himself an excellent ranch house of sawed lumber, with iron roof, built a good corral and out-buildings, and put up a considerable amount of barbedwire fencing.

Americans Gathering Herds.—Many of the American planters are securing small herds of cattle, that owned by F. C. Cook, on the Bulatakay River, now numbering about 40 head. There is scarcely a plantation in the district that does not possess enough range to support from 100 to 150 head of cattle. The district jealously guards against all possible infection from the outside world. The cattle require but little care. There is no reason why Davao should not ship several thousand head of cattle every month to Manila, and secure a good price from them.

Sarangani Bay Country Ideal Cattle Land.—Governor Bolton states that the country around Sarangani Bay is especially adapted to stock growing, particularly the valley running due N. from the bay into the District of Davao. It is rich in a sort of bunch grass which the cattle devour almost ravenously. It is exceptionally well watered as well, and will, in the opinion of the governor, easily support 100,000 cattle.

HISTORY OF DAVAO

In September, 1848, José Oyanguren, a native of Vergara, Spain, appeared before Davao with a flotilla of 14 sailboats carrying 70 persons. Oyanguren's mission was the destruction of Moro power in the gulf. The principal Moro strongholds were Davao, Padada, Tagun, Hijo, and Sumlug. Oyanguren's forces, aided by the Monobos and Samals, immediately attempted to force the mouth of the Davao River but were repulsed. Oyanguren then spent 3 mos. investing the fort on the hill overlooking the present site of Davao. In the latter part of December, 1848, after a bombardment of three days, the Moros fled. Remaining peaceable until 1861 they then killed Governor Pinzon, at Tagun. The Moros of Padada, advancing against Davao, were defeated near Tagulaya by the Spanish forces. Great progress was made toward civilization under the Spanish rule, largely due to the high character and purpose of the Jesuit Fathers, against whom no charges of immorality or fraud have ever been made. There were in all 24 Spanish governors from 1848 to 1899. During the interim between Spanish evacuation and American occupation, Davao was in a state of anarchy, murder and rapine being the order of the day. The last scene in this tragic comedy was the entrance into Davao of Samuel Navarro at the head of a large force of Moros and Visayans; his disarmament of the Tagalogs and subsequent arbitrary rule. On December 9th, 1899, a captain of the 23d United States Infantry, accompanied by a newspaper correspondent, landed from the steamer Chiruca; Navarro was requested by the captain to hoist the American flag, which was willingly done. On December 14th, 1899, General Bates arrived, with the first American troops, on the transport *Manila*. Two companies of the 31st Volunteer Infantry were left as a garrison under command of Major Liggett. The condition of the inhabitants at this time was pitiable. From December 14th, 1899, to October 23d, 1903, Davao was practically under military rule. Since latter date the town and district have formed part of the Moro Province. There has been wonderful prosperity under American rule. The town has 1,800 inhabitants; with its dependent barrios and villages 11,000 inhabitants. The public buildings are the church, convent, tribunal, district office building, schoolhouses, governor's residence, hospital, barracks, and jail. Improvements are: American street lamps, port light, solid rock road to beach, macadamized business streets, removal of all dilapidated buildings, renovation of all public edifices, strict observance of sanitary ordinances, erection of store houses, business houses, and first-class residences. There are a number of good businees houses in Davao, the principal ones, taken at random, are those of A. Matuti, Juan Auad, José Bastida, Chicote & Sanchez, Sociedad Agricola, and J. B. Bansing; the above-mentioned firms all deal in dry goods, hardware, groceries, hemp, and almaciga, Juan Auad being the sole exception. He deals in groceries and liquors only. The Sociedad Agricola is an association formed by six of the principal Filipinos, D. Suazo, F. Bangoy, C. Rasay, T. P. Gil, M. A. Generoso, and J. Saavedra. Money is easy, the town exhibiting prosperity to the casual observer. People of all classes evince a commendable public spirit, and are proud of their town and its future. If the inhabitants preserve, as seems probable, this spirit of progress, unity, and local pride, Davao should in the near future rank high in the Philippine Islands as an agricultural center and port of trade.

HEMP AND COCOANUT PLANTATIONS OF THE DAVAO DISTRICT

Every resident of Davao points with pride to Captain J. L. Burchfield, the pioneer American planter of the district. He has not only demonstrated that modern methods applied to hemp growing in Davao bring enormous returns, but has used every effort to induce Americans to go there and settle. He is a permanent settler, and his beautiful modern house in Davao is thrown hospitably open to all visitors who are interested in the development of the country. His watchword is *Progress*, and he is a firm advocate of every measure that will induce capital and immigration to open up the immense tracts of fertile country, construct good roads, stimulate commercial and industrial growth, and build up a prosperous and progressive American community.

CAPTAIN J. L. BURCHFIELD,

Pioneer Planter and Leading Resident of the Davao District.

Captain Burchfield comes from Madisonville, Ky., where he was engaged for many years in the contracting business. As an officer of the Thirty-first Volunteers he first landed in Davao in December 1899. It is his proud boast that he has never heard a hostile shot fired in the district. Attracted by the excellence of the climate and the fertility of the soil, he determined, long before his company was withdrawn, to make his home in Davao, and to grow up with the country. By special permission he was mustered out of the service at Davao, and has since made that his home.

The few years that have intervened have fully demonstrated the wisdom of the course pursued by Captain Burchfield. His material wealth has increased tenfold, he owns a magnificent plantation, has a beautiful home in town, and during the whole time has enjoyed such health and comfort as he had at no former period of his life. He has devoted much time and effort to assisting other Americans to establish themselves and build homes in the district, and has found time withal to help materially the progress of the entire community.

Mrs. Burchfield went to Davao in April, 1901, to make it her permanent home, and was the first American woman ever in Davao. She accepted cheerfully the hardships of those pioneer days, and has established a home that is famous for its hospitality and good cheer throughout the entire archipelago.

It was several months after the arrival of Mrs. Burchfield that other women, American wives of Army officers and government officials, emboldened by her example, went to Davao to reside, and to be charmed with the salubrious climate and simple life of that region. Now there are a number of American ladies in the district, who enjoy such good health and material comforts that they no longer feel they are pioneers.

The Kentucky Plantation is the handsome property of Captain Burchfield. It is situated at Daliao, on the W. shore of the gulf, about 9 ms. S. of Davao. Before settling at Daliao, Captain Burchfield explored the coast for many miles, and while he saw many fine locations, the present site of the Kentucky Plantation pleased him best. At the time there were patches of hemp scattered along the coast as far S. as Daron. The annual shipments of the fiber, however, did not amount to more than 2,500 piculs, valued at ₱50,000, while today the monthly shipments from the district reach that figure.

The Kentucky plantation is on level ground, only a few feet above sea level, and has a frontage of ¼ m. along the gulf shore. The site was specially selected by Señor Sanchez, one of the oldest and most successful Spanish planters. At that time there were about 20,000 hemp plants growing in that vicinity owned for the most part by small Filipino planters.

Captain Burchfield started out a tract of land in April, 1901, which has never been surveyed, but which is variously estimated to contain from 500 to 600 acres. Quit-claim deeds were secured by purchase from the owners of small hemp patches, and the work of cleaning and fencing commenced. At the same time a general store was established on the beach for the benefit of the laborers. During the first year only 5,000 hemp plants were set out. During the past 3½ yrs., about 250 acres of the plantation have been brought under cultivation, and over 100,000 hemp plants set out on the tract. This has been done at a total outlay of ₱10,000 in actual cash capital. Captain Burchfield commenced stripping 2 yr. old hemp in 1903, and is now cutting and stripping from 60,000 Tangongon and Maguindanaw plants—both hardy varieties. These plants attain a height of from 15′ to 20′ in 2 yrs. from the time of planting. Each original seed produces about 15 stalks, and each matured stalk will strip about ¾ lb. of hemp fibre, averaging 12′ in length. The crop is continuous, as the old stalks are constantly maturing and new shoots appearing from the hill. At the present time Captain Burchfield is shipping from 60 to 80 piculs per month from his own plantation, but could do more if labor were available, as it soon will be. He thinks that a hemp-stripping machine will soon be in the market that will replace a large percentage of the skilled labor, and bring much larger profits to the planter.

The Kentucky Plantation has been the first one to introduce American farm machinery. American plows, disc harrows and tooth harrows, all drawn by carabao, have been in use since the first field was planted. Captain Burchfield finds that he gets the best results by plowing between the rows of hemp, which are 9′ apart, every 4 mos., going over the field twice each time. The soil is afterward pulverized with the harrows. This treatment keeps down the weeds and jungle growth, and the loosening of the earth enables the roots to take a good hold. When the hemp reaches a height of 10′ or 12′ the leaves underneath become dry and shriveled. These on the Kentucky Plantation are cut away every few months, and left to rot on the ground. This work greatly reduced the danger of damage by fire. In the course of time the trash on the ground becomes so as to prevent further cultivation, but at the same time it kills off the jungle growth, and keeps the ground soft and damp. The cost of caring for the 250 acres of hemp at the present time is about ₱500 per month.

The bulk of the laborers in the Kentucky Plantation are Moros. They belong to a tribe that has lived on the Davao Coast for many years, and have never been known to be warlike. Captain Burchfield finds them more reliable than the hill tribes of wild people. They are not a lazy people, but have slothful and indolent ways that make close supervision necessary. They are perfectly satisfied to work from daylight till dark for 50 *centavos* per day. The majority of them do not work steadily, as they have no use for the money. Occasionally one is found more industrious than his fellows, but his surplus money all goes to purchase *agons* or Chinese gongs. Captain Burchfield imported a number of Japanese laborers, but they have proved very unsatisfactory, and he has now only half a dozen on the place. As a rule from 35 to 40 Moros laborers turn out for labor every morning. The foremen are all Visayans.

There are about 3000 cocoanut trees now growing on the Kentucky Plantation. They have been interplanted in the hemp fields nearest to the beach, the method being to replace every fourth hemp hill with a cocoanut

THE BURCHFIELD HOME IN DAVAO

so that the trees are 36′ apart. Captain Burchfield is a firm believer in the future of copra in the district and proposes to plant many more cocoanuts on his place. He owns a half interest in a cocoanut plantation on the E. of the gulf, at Piso, 30 ms. from Davao. His partner, Peter Harding, settled at Piso, about 4 yrs. ago, and already has 12,000 cocoanut trees set out, making his place the largest copra plantation in this region, and he is still planting.

Mr. Harding has spent most of his life in the United States as a miner. He can boast of having taken out $30,000 in gold dust in one day on the Klondike, but thinks that he has a better and surer thing here planting cocoanuts. He lives alone among the Moros, far from any other planter, and has a higher rating among those people than any sultan in the province. Mr. Harding has collected and shipped about 1,000 piculs of almaciga (a forest product from which copal varnish is made) at Piso. For his own amusement and instruction, he conducts a considerable experimental farm, and his experience will prove of great value to settlers.

The cattle business is another hobby of Captain Burchfield. His first investment in Davao was in a herd of cattle, numbering 150, for which he paid $898, in U. S currency. He butchered for the troops stationed there, selling fine young steers at 12½ c. per lb., dressed, when the government was paying more than twice that price in Manila, and in 2 yrs. cleared $3,500 gold, and still had a good herd of cattle. He thinks that every planter ought to have his herd of cattle, as there is good range land on every plantation. No disease nor epidemic of cattle has ever been known there. Cattle require but little care. There is always ample pasturage, and the country is well watered in every locality.

The general store established by Captain Burchfield at Daliao has contributed in no small measure to his success. The daily average of business is surprisingly large, especially when one considers that the purchasers are the Moros and hill tribe people. Many of the planters further down the coast, who have small stores on their plantations, do their buying through Captain Burchfield.

Much hemp from the surrounding region is also assembled there. A good-sized steamship can anchor within 200′ of the shore in 8 fathoms of water.

Early in January the S. S. *Aeolus* spent two days discharging cargo and loading hemp, where, 2 yrs. ago, all the trading had to be done in small row boats.

Captain Burchfield has just completed building a very staunch launch, 35′ in length, which will be furnished with a 10-h. p. gasoline engine. This boat was built in Davao. It will be valuable in the coastwise trade, as at the present time most of the coastwise business must be done in small sail boats.

Captain Burchfield is still planting hemp, and says that he expects to go on doing so as long as he owns a plantation. "It is the only real lasting fever I know, and the better hold it takes on a man the better he feels as the years roll by," says Captain Burchfield.

MANAGER WILCOX AND HIS HOME AT COOKSVILLE

COOKSVILLE ENTERPRISES

FRANK C. COOK, PRESIDENT OF THE DAVAO PLANTERS' ASSOCIATION AND FOUNDER OF COOKSVILLE, ON THE BULUTAKAY RIVER

To Frank C. Cook, the hustling President of the Planters' Association, belongs the credit of first organizing the wild mountain tribes along the coast, and making them industrial factors in the development of the Davao District. Encouraged by the success of Captain Burchfield, whose fame as a planter soon reached the outside world, Mr. Cook visited Davao in September, 1903, and after a look over the field at once decided to invest his capital there. Accompanied only by two Visayan laborers, he set off down the coast in an open canoe, and located on a strip of land along the mouth of the Balutaca River, about 45 ms. S. of Davao, on the W. coast of the gulf. His first house was on the beach, but the first clearing was made about 1 m. inland, at a point where the old government trail crosses the Bulutaka River. There is to be found the widest and deepest valley along the W. shore of the gulf, watered by the Digos, Bulutakay, and Padada rivers. The valley is about 15 ms. in width and extends back about 40 ms. to the base of Mount Apo, a volcano reaching an elevation of 10,000′ above sea level. The land is level and covered with a heavy growth of virgin forest, rich in hard woods, cinnamon, and many other valuable forest products. The soil is a rich sandy loam, and the rainfall evenly distributed, so that the valley is adapted to the cultivation of all the products of this region.

The tribes living in the mountains were the Bagobos, Bilans, Calaganes and Tagacaolos—all wild and timid people, at war with each other, ready to fly at the approach of civilized man and living practically by the chase.

At first Mr. Cook found it difficult to get into communication with these people, but by living there alone and practically unprotected, he first got their confidence. Then by kindness and promises of protection, by advising them in their tribal relations and by doctoring them when they were ill, he gradually got them to settle about him.

A village street was laid out, shade trees planted and houses built for them. The Calagans, particularly, showed a willingness to work in the fields, and accepted food, clothing and merchandise in return, rather than money. This process went on, until, at the end of 2 yrs. Mr. Cook had a village of about 300 people on. his plantation, and can today put about 100 men in the field at any time. The people are simple-minded and good workers. While they go about armed with spears, knives, bolos, and even guns, they have never molested any white man in the region nor committed violent crimes among themselves. They have a high code of morals, rarely steal, and are very honest about paying any debts they contract. Considering the facts that they invariably ask for credit, this is an excellent thing for the planter.

During the time that Mr. Cook personally managed the plantation, he cleared about 200 acres of land, and set out 24,000 hemp plants and 10,000 cocoanuts. He built a substantial house on the government trail, which is now occupied by O. B. Watkins, superintendent and a partner in the property. The cocoanuts are interplanted in the hemp, the trees being 30 ft. apart.

While Mr. Cook is a firm believer in the future of Davao hemp, the copra industry has proved a greater attraction, and he is now investing all his capital and devoting most of his time and efforts to cocoanuts He has formed a company, incorporated, known as the Davao Agricultural Company, and has taken up the full amount of land permitted by law—2,500 acres. During present year 20,000 cocoanuts will be planted along the Bulataka River and the seabeach. The seed is already on the ground and the clearings well under way. After much study it has been decided to interplant rubber and cacao in the cocoanuts. About 1,500 pará rubber trees and 3,000 cearea plants are already in the nursery, and about ready to set out, while 15,000 castalloa seeds (from Ceylon) have been ordered and will be ready to set out this year. About 2,500 cacao trees are now in the nursery, and will be ready to set out by the time the ground is ready.

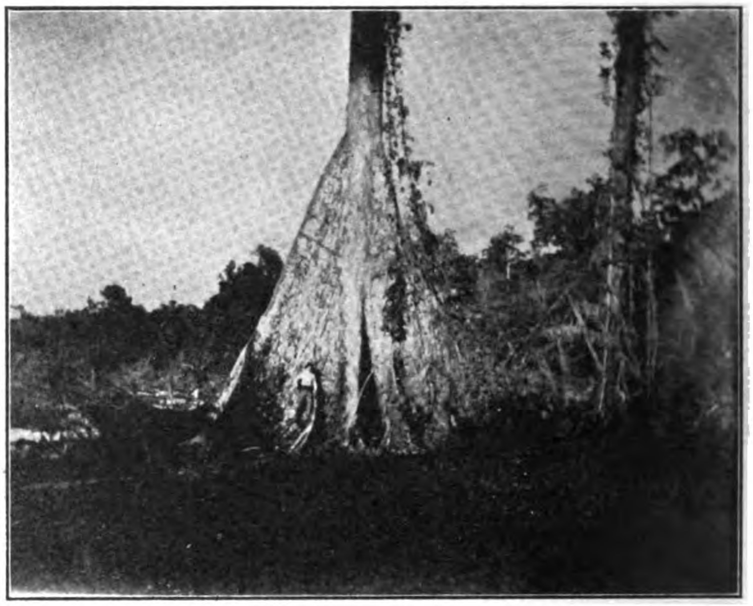
The Davao Agricultural and Commercial Company was organized in September, 1903, with James M. Welborn as president, F. C. Cook as secretary and treasurer, and O. B. Watkins as superintendent. The capital stock of the concern is ₱45,000, but up to date only ⅓ of that amount has been expended.The company has erected a warehouse at Davao and is now building another at Balutakay River. Incidentally, the Company has acquired a fine herd of cattle, a small flock of goats, for which there is ample pasture on the plantation. The entire plantation will be surrounded by woven-wire fencing, which will be proof against all animals that roam the jungle and are a menace to growing crops. Within a few months Mr. Welborn expects to dispose of his interests in other parts of the province, and join Mr. Cook in handling the Davao business.

JOSE PARADA PAYA

The most extensive planter in the vicinity of Santa Cruz is José Parada Paya, a Chinese who has been a resident of the place for 17 yrs., and who now has from 60,000 to 75,000 plants yielding hemp fiber. He conducts a mercantile business in town, and has the reputation of being very wealthy.

ON THE BULUTAKAY RIVER; NATIVES RETURNING FROM MOUNTAINS WITH RAFTS LOADED WITH RICE

STRIPPING HEMP, AMERICAN PLANTATION, TAGUN RIVER



A BIG TREE ON THE AMERICAN PLANTATION, TAGUN RIVER

DAVAO TRADING AND DEVELOPMENT COMPANY

Max L. McCollough, deputy governor of the district, secretary of the Davao Planters' Association and enthusiastic planter, is associated with J. N. Carrigan and others in a plantation at Malalag Bay, which is still too young to say much about. While hemp is to be the staple product of the Davao Trading and Development Company (Inc.) plantation, the promoters are experimenting largely in many other kinds of tropical produce that have given good returns in the Federated Malay States, the Straits Settlements, Borneo, Java, and Ceylon. Mr. McCollough believes that the wise planter will not rely solely upon one crop. The following memoranda, furnished to The FAR EASTERN REVIEW, will prove of interest to inquirers concerning the plantation in question:—

The Davao Trading and Development Company, Inc.

Principal Object: Purchase and development of public lands.

Principal Place of Business: Davao, District of Davao, P. I.

Capitalization: $25,000 gold.

Number of Members: Four.

Period of Life Under Present Articles of Incorporation: 50 yrs.

Location: Malalag, between end of bay and gulf.

Date First Occupied: May 15th, 1904.

Clearing: 25 acres.

Main Crop: Hemp, 10,000 in clearing; 10,000 in nursery.

Additional Crops Planted: Pará rubber, Castillos rubber, kepoc, lemon grass, cocoanuts; also specimens of apricot, plum, coffee, almond, walnut, and peach.

Labor Supply: Hill tribes, Tagacolos and Manobos. Supply inconstant and insufficient.

Wages: Paid in commodities value 50c. Philippine currency per day.

NOTE:—Good port and approach by salt water by bay or gulf; land level and clearing moderately easy; abundance of water for man and irrigation; possible jungle produce, beeswax, biao nuts, rattan, tangal bark, cutch, and nipa; strong fencing necessary against wild hogs and deer; woven-wire fencing most satisfactory.

In future the company may do some commercial business.

Mr. McCollough is a Californian and a graduate of Stanford University. He was formerly editor of the *Official Gazette* in Manila. His work as deputy to the governor takes him out among the natives for the greater portion of his time, but he finds leisure enough to keep up the correspondence and work of the planters' association.

Mr. Carrigan, who is a classmate of Mr. McCollough and a member of a prominent San Francisco family, is now in the United States on business connected with the plantation.

TEADORO PALMA GIL, PLANTER

Señor Teadoro Palma Gil is one of the leading Filipino planters in the Davao District. He is a Visayan by birth, a man of education, somewhat travelled, progressive in spirit, and a member of the city council of the Pueblo of Davao. His photo appears in another column in company with Governor Bolton as one of his interpreters during the early days of his stewardship of the district of Davao.

Señor Palma Gil is interested both in hemp and copra, and is proprietor of no less than four fine plantations—two devoted to hemp, and two to copra. His most extensive holding is at Languan, about 9 ms. up the Davao River, this property adjoining that of Señor Auad. There he has 154 *hectares* of land, and on it about 80,000 hemp plants, of which 40,000 are now bearing. He plants there, in the rich river bottoms, Taugunan and Babanan hemp, and has secured very satisfactory results from both varieties.

At Má, 4½ ms. above Davao, Señor Palma Gil has a tract of 40 *hectares*, all under cultivation, and there he is stripping from 35,000 Taugunan and Maguindanao plants—an excellent property.

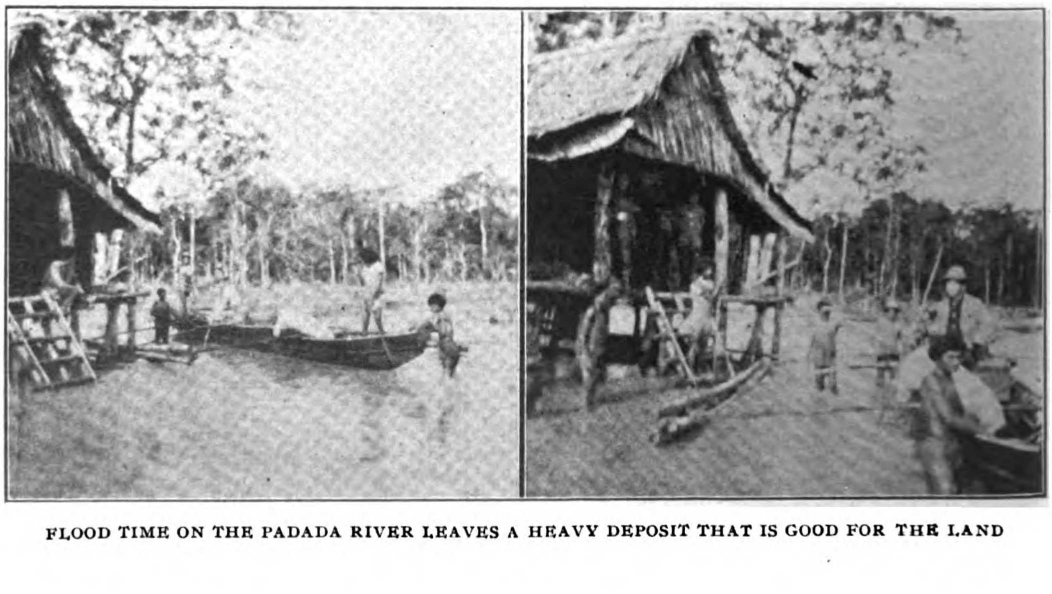
About 6 ms. NE. of Davao, along the coast, Señor Palma Gil owns a strip of 100 *hectares*, all of which he proposes to plant in cocoanuts. There is now a grove of 200 bearing trees on the place, and ground has already been cleared for 20,000 more trees, which will be set out within a few months.

Señor Palma Gil employs about the same class of labor as his American neighbors. He is the owner of two fine pantation houses, as well as a fine residence in town, and the hospitality to be found at his home is as free and as generous as that of any American planter in the far-famed Sunny South of the homeland.

V. VANDERMEIER'S ESTATE

V. Vandermeier, a Flemish planter who resided in Davao for 18 mos. as agent for the Philippine Trading Company of Manila, recently purchased an estate just S. of Santa Cruz, which was started by an aged American. He has 200 acres of ground and on it 23,000 hemp plants, all under fence. About 5,000 plants are matured. He also has about 1,200 cocoanuts set out. Mr. Vandermeier is a hard worker and will soon have his whole place under cultivation. The bulk of the land is on a gentle slope, and the clearing very light In this vicinity wild hogs have been troublesome. Not only is the hog-tight stockade fence a necessity, but Mr. Vandermeier has also adopted the expedient of keeping his sprouted cocoanuts in the nursery until the kernel of the nut has all been absorbed by the growing plant.

Sugar Land.—Adjoining Santa Cruz there is a broad plateau, containing from 1,500 to 2,000 acres, which will, it is believed, make fine sugar land. There is a small patch of cane growing on the tract. Some of the stalks, which have been trained upon the trunk of a dead tree, are from 30′ to 35′ in length—this on the evidence of F. C. Cook and the Rev. Mr. Black. Sugar cane is grown in small quantities all through the district.



FLOOD TIME ON THE PADADA RIVER LEAVES A HEAVY DEPOSIT THAT IS GOOD FOR THE LAND

MESSRS. KELLER & GOHN IN A FIELD OF 12-MONTHS-OLD HEMP AT SANTA CRUZ, DISTRICT OF DAVAO; CALAGANS DIGGING CAMOTES IN HEMP FIELD OF THE MINDANAO ESTATES COMPANY'S PLANTATION ON THE PADADA RIVER; IN A "FOREST" OF HEMP ON SENOR SANCHEZ'S PLANTATION AT DIRON

KELLER & GOHN'S PLANTATION

The first successful attempt at irrigation in the Davao District has recently been made at Santa Cruz on the plantation of Messrs. Keller & Gohn. For some curious meteorological reason the region in the immediate region of Santa Cruz suffers from drought more than any other part of the district. There are other plantations within the dry belt, and conditions had been looking blue for all until the recent irrigation scheme of Keller & Gohn, enterprising and up-to-date Americans, proved such a success. There is no reason why every planter in the vicinity may not enjoy equal blessings with them, and so it will be in the near future.

Keller & Gohn were formerly soldiers in the 17th U. S. Infantry, members of the companies stationed at Davao. They contracted the *hemp fever* long before they left the service. With characteristic American pluck and energy they went about it to acquire a plantation. Both men had explored the district pretty thoroughly, and they finally decided to settle at Santa Cruz, 30 ms. S. of Davao, where they acquired, by purchase, about 600 acres of good land immediately adjoining the town. Mr. Gohn took up his residence on the land more than 18 mos. ago and was afterwards joined by his partner. They also conduct a general store.

In all, these planters have out 30,000 hemp plants to date. The drought retarded their growth, and, although in favorable spots the fiber grew to great length, the plantation was practically a failure until it was found that the land could be irrigated in modern style. By the expenditure of only ₱50 in cash and a considerable amount of patience and ingenuity, a large stream was tapped and an irrigation system established all over the place that can be kept under perfect control.

At last accounts this batch of hemp was growing faster than any in the district. The promoters refused a handsome price for their plantation and are going ahead with their clearings as fast as possible. In this vicinity the clearing of land is comparatively light, costing only ₱30 per *hectare*. Recently Keller & Gohn let a contract to responsible Filipinos to clear, burn, and plant 15 *hectares* of land for ₱50 per *hectare*, seeds being furnished to the contractors. This contract also includes the planting of camotes, which are laid in the hemp on many places to keep down the weeds and jungle growth.

Keller & Gohn's scheme of handling labor differs materially from that of other planters in the district. They employ from 12 to 15 field hands by the month, paying them ₱15 and furnishing them with free houses, camotes, and such fruits as grow on the place. These employees are all Filipinos and Moros. Parties of Bagobos come down from the mountains about twice a week, and are employed at the usual wage of 50 centavos (25c gold) per day.

Keller & Gohn own a number of old cocoanut trees and propose to set out a large number of new ones this year. They have 300 in the nursery, already sprouted, which they will interplant in the hemp.

MALALAG BAY PLANTATIONS

Malalag Bay is the most perfectly protected, deepwater harbor in the district. It is about 50 ms. S. of Davao, is land-locked, and has deep water right up to the shore. It is said that an engineer who was sent to Davao to report on the feasibility of building a dock, declared Malalag to be the better place. However, there is only a comparatively small open country back of it. In Spanish times there was a small penal colony at Malalag, but the only relics of it today are a few broken piling where there was formerly a small wharf, and some scattered houses. A few Filipinos live in the vicinity.

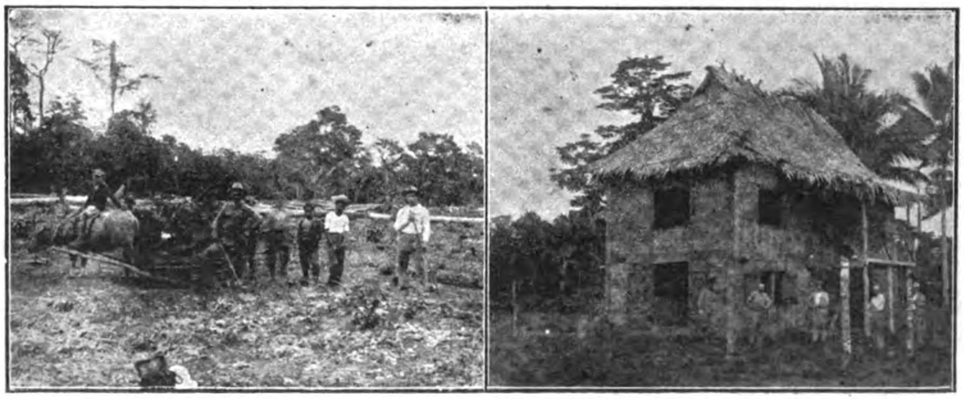
There are four American plantations about Malalag, which take up all the available land in that vicinity. Three of these—the Pioneer, the Malalag Bay Company's, and Reid & Cochrane's—occupy the long, narrow valley that leads back to the foothills. The fourth, that of the Davao Trading and Development Company, referred to in another column, occupying the level country between the head of the bay and the gulf. The valley is watered by three fine streams. It is about 2 ms. wide, and level for a distance of 7 to 8 ms., to the foothills. A chain of low hills runs almost across the sea end, but back of that the country is level, the soil rich, and the timber and jungle comparatively light

Pioneer Plantation.—The pioneer of this region is John Byrne, a sterling American, who has won the confidence of the government and is *presidente* of the town. He is at the head of the Pioneer Plantation, and has associated with him T. F. Kelley and James Manning of Manila. Mr. Byrne first prospected the valley in January, 1904, and located and commenced planting in April of the same year. He has 14,000 hemp plants now about 13 mos. old and doing splendidly. Large clearings are going forward, and by the end of the present year the acreage of hemp will be greatly increased. He has just finished planting 15,000 more hemp trees.

Benjamin Paul and H. E. Reid.—Through the reports of Mr. Byrne, Benjamin Paul was induced to locate in the valley in May, 1904, and H. E. Reid 2 mos. later. At the suggestion of Mr. Byrne, each located on a strip extending the length of the valley so that all could have equal facilities. Each plantation is about 1,000 yds. wide, the Pioneer in the center, and roads will be set aside and maintained between them, each planter bearing his share of the expense.

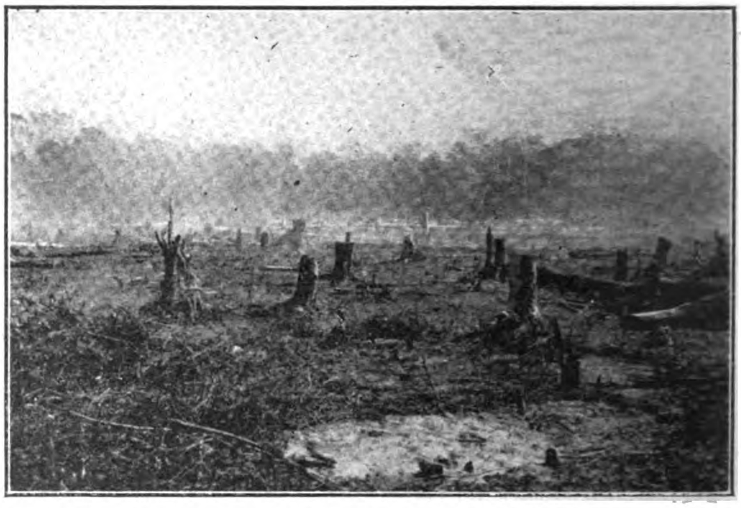
Mr. Paul is a typical pioneer, broad-shouldered, and not afraid of work. He formed a company known as the Malalag Bay Company, in which are associated Otto W. Nesbit, Orville Hughes, and T. P. Neimann, all of Manila. They have 14,000 hemp plants about 1 yr. old under fence, and 15,000 more ready to be set out.

Mr. Reid, who has F. C. Cochrane, of Jolo, associated with him, has 6,000 plants growing, and is now ready to set out about 12,000 more. The planters in this valley all have great faith in cacao and will interplant it in the hemp. An orchard of cacao in Malalag Village has



BOGOBO LABORERS PLANTING HEMP ON MESSRS. KELLER & GOHN'S PLANTATION AT SANTA CRUZ; LATTERS' STORE AND RESIDENCE

CLEARING IN MALALAG VALLEY SHOWING LAND COVERED WITH CAMOTE VINES TO KEEP DOWN THE JUNGLE GROWTH



APPEARANCE OF HEMP LAND AFTER THE FIRST BURNING, PADADA RIVER; SMOKE FROM BURNING BRUSH IN THE DISTANCE

yielded tremendous returns for many years. The cacao trees will be set out between the rows of hemp. The lines of these plantations run due N. and S.

The principal labor in this section is Tagacaola (mountain people), and the supply is very satisfactory. There are about 2,000 of them in the mountains at the head of the valley. Villages are being built for them at the lower end of the plantations.

JUAN AUAD'S PLANTATION

One of the oldest and most interesting plantations in the district is that of Señor Juan Auad. The proprietor, an Assyrian by birth, came to the Philippines in 1890 as a travelling merchant, and after trading through the entire archipelago for more than 2 yrs., decided to settle in Davao, then a small Spanish outpost, and grow hemp. He had a little capital, with it he secured a grant to a tract ol land along both banks of the Davao River, about 12 ms. above the Spanish military post—now Davao. The Spanish officers at the post had never been that far up the river, and strongly advised him not to go; but the pioneer was willing to take the chances in order to secure the rich river bottom land. During the following years, from 1894 to 1897, he secured patents to 546 *hectares* ol land, in a strip which extends along the river with an average width of ½ m.

In 1893 Mr. Auad planted 5,000 hemp. From that seed he has today 140,000 hills of

SR. JUAN AUAD, PROMINENT PLANTER AND MERCHANT OF THE DAVAO DISTRICT

the fiber, which makes him the biggest individual holder in the district. He has 350 acres of ground under cultivation in hemp alone, and is still clearing and planting. "When a man stops, he goes back," says Señor Auad, quoting an old proverb of his country, and he declares that he will go on planting until he is through with life.

Belen is the name of Señor Auad's plantation, near the town of Lapanday. There he has erected a beautiful house on a hillside, overlooking his plantation, where a cloud of servants wait on the visitor. There are American roses blooming in the garden, and the sea breezes, coming over the low-lying lands to the E., cool the house to perfection. The cocoanut grove to the right looks cool and inviting. In the hollow below the canoes and heavily laden rafts glide by on the river, bound for the sea and the metropolis of the district. Belen is charming in every way, and the proper country home of one of the wealthiest and most successful planters in the district.

Señor Auad, now in middle age, is inclined according to the custom of his country to make light of his hemp growing. However, his plantation, his large mercantile business in Davao, his style of living, and his reported liberality, all bear evidence to the fact that the life of a planter is not to be despised, and that the years of toil, now ended, have borne much rich fruit. There have been bad years with Señor Auad. Before the Americans settled the country, the wild tribes were turbulent, labor scarce, proper protection lacking, and life in the *bosque* uncertain. It took courage, patience, and perseverance to live on the frontier. The handicap Señor Auad had to overcome in the old days is shown by the fact that since 1900, the date of American occupation, he has planted twice as much hemp as during all the previous years, and has built up, during the same period, a splendid mercantile establishment in Davao. Today Señor Auad is stripping fibre from about 80,000 hills of hemp—about all he can handle with his present force of laborers. He markets annually about 1,000 piculs of hemp from his own plan ation. The hemp is all from river bottom land. Señor Auad has tried the hill sides, but with poor success. Along the bottoms the hemp stalks grow to a height of over 20' and are very plump. The fiber is long, strong and white. Señor Auad is very particular about the way in which his hemp is stripped and handled; which accounts for the fact that Belen hemp commands the highest price in Davao market. Last year it ran as high as ₱26 per picul.

Señor Auad has tried many kinds of labor, but finds none equal to the wild people of the mountains. The Japanese, he says, will only work at stripping hemp, are lazy and unsteady, and if not watched closely will ruin a hemp field. He pays then ₱0.50 per day, and allows ₱0.30 per day for each man for food, supplying them, rent free, with excellent quarters. During a period of 30 mos. he reckons that his gang of Japanese have wasted ₱7,000 worth of fiber. The Visayans on the place have all been brought in from Cebu, and receive the same wage as the Japanese. Señor Auad declares, as do other planters, that they are people accustomed to agitation and not to manual labor; are lazy and given to petty thieving, and gamble away their savings, which amount from ₱7 to ₱10 per month. While they have money, he says, they will not work.

Cocoanuts do not do well at Belen. He planted 700 trees 10 yrs. ago, and has just taken off his first crop, netting fruit about ₱400 in the market. He has also tried cacao, but after investing ₱5,000 gave it up as a bad job, and left his trees to the insects. Señor Auad admits, however, that he never attempted to fight the pests that destroy the cacao.

In Davao Señor Auad has a fine mercantile business which he started but 3 yrs. ago, and that now occupies the major portion of his time. He is a broad-minded and generou citizen, and has the confidence of his town people.

NAVARRO PLANTATION

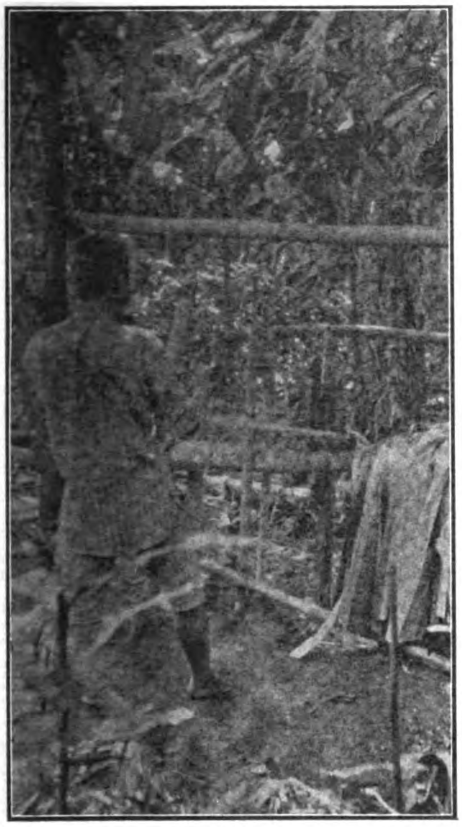
At Lasang, just S. of the Tagun River, is the prosperous *hacienda* of Samuel Navarro a half-Moro, half-Visayan, who at one time ruled Davao with a rod of iron. During the insurrection in 1896, he, with only 18 followers, captured the Town of Davao where he remained absolute despot of the region thereabout until the Americans arrived on the scene, when he promptly hoisted the Stars and Stripes and acknowledged the sovereignty of the United States, even though his followers threatened him with all sorts of dire calamities. So zealous

SENOR NAVARRO'S HACIENDA AT DIRON; COCOANUT TREE WITH 240 NUTS AT BACK OF HOUSE

in the new cause did he prove to be that Governor Bolton made him head man over a considerable number of Moros in his section, and the governor has never had reason to regret his action.

In 1900 Señor Navarro settled at Lasang and began the cultivation of hemp. Although he is altogether illiterate, he has a business head. From a fisherman he became a planter. Today he is stripping from 36,000 hemp plants, is free from debt, and has an assured income of ₱3,600 a year.

WILSON PLANTATION COMPANY



JAPANESE STRIPPING HEMP

At Lacaron, 4 ms. N. of Malita, Mr. C. D. Wilson has recently taken up for a Manila company, of which he is manager, 2,500 acres of hemp land. This land is similarly situated to that of the adjoining plantations in the same section, and labor is plentiful. At the present writing he has under way about 12,000 plants and ready to complete an additional 12,000 plants when planting time arrives. Mr. Wilson is a typical pioneer, and through ceaseless push and undaunted faith in his ultimate success and the possibilities that lie in hemp and cocoanuts, together with unusually favorable conditions, he has in the short period of his company's existence, brought about a showing second to none in the district, and certainly hard to improve upon.

CULAMAN PLANTATION

That portion of the coast S. of Malalag Bay, known as the Malita District, presents conditions differing somewhat from the section already described. The mountains run down to the gulf in points, and between the points are recesses of comparatively low and level land. The soil is rich and alluvial. Each recess is drained by two or more clear mountain streams. The jungle is light and easily cleared. Within each recess is room for a splendid plantation.

The first plantation located in that section was that of The Culaman Company, on the Malita River, about 40 ms. due S. from Davao, but nearly 100 ms. distant from the capital by the beach road. The Culaman Company was organized in Davao on March 1st, 1903, by Governor Bolton, Dr. R. King Cole, O. V. Wood, D. M. Cheston, 17th. Inf., and Lieut. F. D. Toulois, 17th Inf, with a working capital of ₱12,000. At that time the only plantation S. of Digos was Cooksville, on the Bulutaka River. Malita is an open roadstead, and difficult of access by land, but the land is so rich and the labor conditions so favorable that the organizers of the Culaman Company preferred it to Malalag and the Digos Valley.

Today the Malita Plantation, as it is generally referred to, is in a most flourishing condition. During the first year 21,000 hemp plants were set out. Up to the end of 1905 this number was more than doubled, and before the present year is finished a total of 100,000 plants will be growing on the place. At the present time fiber is being stripped from 7,000 plants, and by July 1st, fully 13,000 more will be ready for the harvest.

The Culaman Plantation occupies 2,500 acres of land practically all available in the recess it occupies. The distance between the head lands on the beach is about 2 ms., but the valley narrows back towards the mountains, and at a distance of about 4 ms. breaks into foothills, where the land is unfit for hemp culture. One of the favorable conditions is that there are practically no wild hogs there, and fencing is unnecessary. There are two fine clear mountain streams running through the valley, the largest of which is the Malita River.

The hemp fields start back about 1,000 yds. from the beach. The soil is all subirrigated, so that droughts are unknown and impossible there. The strip of land between the hemp and the beach will all eventually be set out in cocoanuts. Up to date only 700 have been planted, but during the present year this number will be increased to fully 5,000. Old cocoanuts in that vicinity show great productiveness.

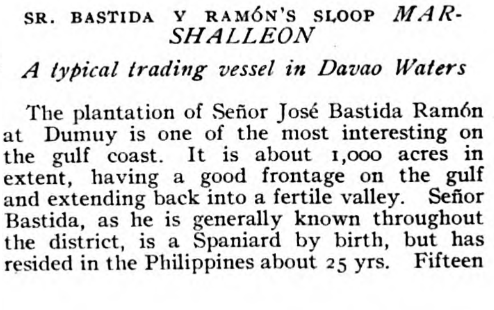
Labor on the Culaman Plantation is plentiful and efficient. The mountain tribes in that vicinity are the Manobos and Tagacaolos. They are willing to work, are peaceful and are glad to receive protection from the Americans. The wage paid is 50 *centavos* per day. The company conducts a store, where the natives do their trading.

Dr. R. King Cole is the general manager of the plantation, as well as secretary and treasurer of the company. He lives at Malita. B. Christian is superintendent.

H. S. Peabody is manager of a plantation at Lais, 5 ms. S of Malita, owned by C. Goodwin, of Manila, first settled there in 1904, but sold out to Mr. Peabody's company last May.

The foundation of the land at Lais is similar to that at Malita, and there is plenty and efficient labor from the neighboring mountain tribes. At the present time Manager Peabody has 12,000 hemp plants set out, but before the end of the year his acreage will be greatly increased. He is an enthusiast in regard to hemp and copra planting, and an intelligent and valuable member of the community.

DUMUY PLANTATION



SR. BASTIDA Y RAMÓN'S SLOOP *MARSHALLEON*

A typical trading vessel in Davao Waters

The plantation of Señor José Bastida Ramón at Dumuy is one of the most interesting on the gulf coast. It is about 1,000 acres in extent, having a good frontage on the gulf and extending back into a fertile valley. Señor Bastida, as he is generally known throughout the district, is a Spaniard by birth, but has resided in the Philippines about 25 yrs. Fifteen yrs. ago he settled in Davao, and secured a grant to the land at Dumuy. He has also holdings at Sigaboy and elsewhere, and is accounted one of the largest land owners in Davao District.

On the Dumuy place Señor Bastida has about 60,000 hemp plants, a large portion of it in full bearing. His fields are well worth visiting. The plants are carefully set out and well cared for, and the result is that they look strong and vigorous, and yield a high percentage of fiber. Señor Bastida is constantly opening up new areas of forest and extending his hemp fields. With him the cultivation of the fiber is no longer an experiment, as it has made him a wealthy man.

There is also a large acreage of cocoanuts on the Dumuy Plantation. The trees are now about 10 yrs. old and all in full bearing. They are planted too closely together to give the best results, but they are still a splendid investment.

On his Sigaboy place Señor Bastida has a number of cocoanuts, but thinks that they do not do as well on the E. coast as in the gulf region.

Señor Bastida at one time owned a fine field of cacao, which yielded very large returns and was noted throughout the entire district; but during the insurrection in 1896, the *cogon* grass grew up and was set fire to, causing the destruction of nearly every tree. This has been the fate of a number of other bearing cacao plantation. Because of the amount of care required to fight the insect pests, most of the planters have not replanted, preferring the surest, if less profit-paying crop of hemp.

Señor Bastida has some fine pasture land at Dumuy, which sustains a large herd of cattle. These cattle yield good returns, and add materially to a planter's profit in the course of a few years. There is not a plantation in the district that does not possess a range, sufficient to at least support 100 head of cattle.

The Dumuy Plantation is the best kept and most prosperous looking on the gulf, and well illustrates the value of diversified products in this region. Señor Bastida is practical and energetic, and while he does not himself live on the place, he has a competent Spanish superintendent. At the present time he is making a practical test of the value of tree cotton. He has just set out 200 trees. From his observation in the past, he expects to bring these trees to bearing in 18 mos., and after that secure from each tree an average of from 20 to 30 lbs. per year. The cotton sells in the Manila market to day at 30 *centavos* per lb. It is easily cleaned and handled.

Señor Bastida is the owner of the sloop *Marshalleón*, 47 tons, built in San Francisco. It trades up and down the gulf, carrying to Davao hemp, copra, almaciga, beeswax, and other forest products.

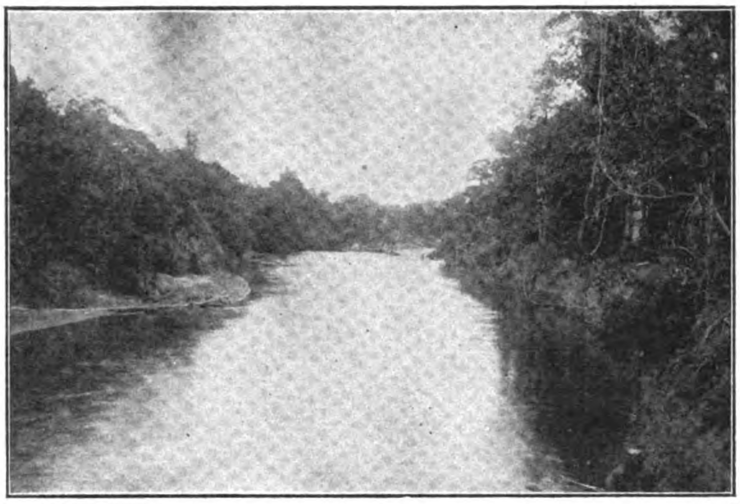
The house of Señor Bastida, in Davao, is modern and comfortable. It cost ₱22,000. It is noted as the first house in Davao. The people of the town point out to prospective hemp growers the success of their prosperous citizen as indicated by his house building operations during the past 8 yrs.

His first home was a modest cottage of purely native style. When his hemp came into bearing he built a more pretentious dwelling, about twice the size of No. 1. The new house recently completed is of stone, iron and hard wood, substantial and roomy enough to last several generations. The three houses are all standing in a row, facing the same street.

Señor Bastida is justice of the peace for Davao, a public spirited citizen, and an excellent neighbor.

MANAGA AND MATIAO PLANTATIONS

On the E. shore of the gulf are plantations at Managa and Matiao, owned by Americans. The Matiao place was started by Messrs. Lindsay & Thompson, who later sold out to a Mr. Rodgers and opened a new place at Managa, where they now reside. They have about 8,000 hemp plants set out, and are clearing more land each month. Mr. Rodgers is reported as having good capital. He has 14,000 plants set out, and also owns a fine stretch of land available for cocoanuts, which he intends to plant on an extensive scale.



PADADA RIVER, LOOKING DOWN STREAM

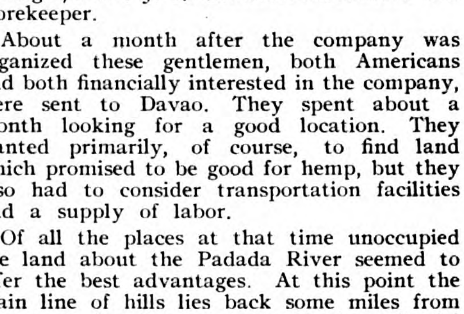
MINDANAO ESTATES COMPANY

The largest plantation in what is known as the Digas Valley is that of the Mindanao Estates Company, lying across the mouth of the Padada River, about 47 ms. S. of Davao. The company was organized in Manila in June, 1904. All the stock which it was desired to sell was subscribed for by the incorporators of the company so that they have not been hampered for lack of funds to carry out their original plans and have been able to devote all their energies to work on the plantation. Dr. Merton L. Miller, chief of the Division of Ethnology of the Bureau of Education, is president of the company; J. H. Shipley is the plantation manager, and . J. E. Schubert accountant and storekeeper.

About a month after the company was organized these gentlemen, both Americans and both financially interested in the company, were sent to Davao. They spent about a month looking for a good location. They wanted primarily, of course, to find land which promised to be good for hemp, but they also had to consider transportation facilities and a supply of labor.

Of all the places at that time unoccupied the land about the Padada River seemed to offer the best advantages. At this point the main line of hills lies back some miles from the coast leaving a gently sloping alluvial plain extending down to the sea. This plain was made by sediment brought down by the river during times of high water and deposited by the stream as its waters subsided. It is virgin soil excepting in a few scattered spots where the natives have made small clearings. For several miles back from the ocean the land is covered with a thick growth of small trees and underbrush. The task of clearing this land would be a serious one if it were not for the fact that all the trees are of soft wood—so soft that a few blows of an axe will cut down a tree of 8 or 10 ins. diameter.

Manager Shipley now has 175 acres of clearing under fence in which 62,000 plants have been set out. He also has under cultivation 1,500 cocoanut trees which are interplanted. The fencing is of the stockade order. The present time the plantation employs from 45 to 50 field hands the year around.



MR. H. S. PEABODY'S HOME ON THE LAIS PLANTATION

LAIS PLANTATION

The most southerly of the American plantations is that of H. S. Peabody, at Lais, a few miles S. of Malite. It is located in a recess of the coast similar to that of the Culuman Plantation. Mr. C. Goodwin, now of Manila, settled there first 2 yrs. ago, but did not like the lonely life and sold out to Mr. Peabody, who, it is understood, is backed by a Manila company. The conditions here are identical with those existing at Malite. There are some 5,000 acres of good ground in the recess. Mr. Peabody now has 22,000 hemp plants set out, some of them of stripping age, and 1,500 cocoanuts. Labor is plentiful, and trading profitable. There is no harbor here, only an open roadstead.

ANICETO BUSTAMANTE

It is interesting to visit the plantation of Aniceto Bustamante, a Visayan, who has lived in the valley below Señor Auad's place for half a century, and whose sons and grandsons own thousands of *hectares* of the finest land in Davao District.

Señor Bustamante is now an old man, but he is still straight and broad-shouldered—a big man for his race. On the occasion of the cortees visit to his hacienda, he was found bolo in hand, working with a gang of men on a clearing of $7\frac{1}{2}$ acres of high land, which is to be planted in cacao. Señor Bustamante has tried cacao in the bottom lands but thinks the water ruined it. He is preparing to fight the insect pests on the high ground. He expects to plant 3,000 trees in the new clearing, which will yield a fair crop in $3\frac{1}{2}$ yrs., and a full crop in the $4\frac{1}{2}$ yrs. Provided he can keep the pest out it will bring him a fortune in 10 yrs.' time.

Señor Bustamante owns 160 acres of land. He has about 20,000 bearing hemp, which yield him a comfortable income. His hacienda in the river bottom is picturesquely situated, and very comfortable. The women of his household dye and spin hemp fiber, and make good cloth. They have cattle, hogs and poultry, a truck garden, and raise fine coffee on the place, the trees bearing in $2\frac{1}{2}$ yrs.

BULUTAKAI HEMP COMPANY

The first stock company formed in the United States for the planting of hemp was the Bulutakai Hemp Company, promoted by J. C. Lenhart, who, with J. P. Skinner, settled on a tract of land on the S. bank of the Bulutakai River about 2 yrs. ago. They did not have the capital necessary to plant on a large scale, so determined to secure it in the homeland. Mr. Lenhart visited the United States, and there published an interesting little pamphlet setting out along conservative lines the advantages of the enterprise. His mission over there was successful beyond the expectations of the promoters and not with plenty of capital at their backs Messrs. Lenhart and Skinner will push the development in their plantation.

PLANTATION OF SENOR MANUEL SANCHEZ

The hacienda of Señor Sanchez, a Spanish planter, at Daron, is the most productive in the district. He commenced planting 16 yrs. ago in the rich bottom lands about 1 m. back from the sea coast, and today has 105,000 hills bearing hemp, from which he has taken as high as 250 piculs in 1 m. His hemp attains a height of considerably over 20′, is plump and strong and yields the finest class of fiber. One field of hemp 13 yrs. old, is today apparently as healthy and strong as that ten yrs. younger, and shows no signs of decrease in the amount of fiber produced.

Señor Sanchez' great trouble is the lack of competent labor. There are so many plantations in his immediate neighborhood that the local laborers cannot take care of the products. Japanese labor has been tried but is never so good, in the opinion of Planter Sanchez, as the native labor, because the Japanese is not versatile enough to perform all the labor required on a plantation, preferring to do only the stripping, which pays the best. At the present writing Señor Sanchez employs about 50 men at stripping alone. The bulk of them are Japanese, but there are a few Moros. He figures that willing workers among the Japanese can earn ₱35 per month, although some average about ₱50. One Japanese earned ₱23.40 in 8 days, 8 stripped 79 piculs between them in 4 mos.' time; however one was ill most of the time, and another a poor workman. These laborers receive about ₱9 per picul for their labor.

Señor Sanchez has his place fenced in with American barbed wire. He has a good herd of cattle. He has tried cacao, and at one time had a flourishing and productive orchard, but it was burned during the insurrection in 1896, when the planters were all obliged to leave their places to the mercy of the *insurrectos*. At Daron the writer and party spent night at the hacienda of Señor Gregorio Palacios, who with his brother, Señor Damaso Palacios, an employe of Matute Hermanos, owns a beautiful stretch of land along the beach at that point. They have just erected a magnificent house facing the open gulf, which will be a landmark in that region for years to come. It is built of stone and hard wood, with corrugated iron roof, is roomy and cool, and has more pretentions toward architecture than any house in the district. These Spanish planters are very hospitable. They live on the products of the country and set a splendid table. The only suggestion of their own country is in the Spanish wine and relishes. Beeves raised on the place supply the neighborhood with fresh beef at least twice a week, and fine fish are always to be had from the gulf. The entire neighborhood of Daron is taken up by Spanish planters.

SENOR FERNANDO NAVARRO

Adjoining to Sanchez hacienda is that of Señor Fernando Navarro, whose house, of the Bungalow type, is on high ground, ½ m. from the beach, and in the midst of a cocoanut grove. One tree almost over the house, had on it, by actual count, 240 nuts. The cocoanut trees in this vicinity are all heavily laden with fruit, and would, in the opinion of Señor Navarro, yield an average of considerably over 100 nuts per tree per year. When it is remembered that in Ceylon an average yield of 50 nuts is considered a big paying proposition, Davao District would seem to have the best of it.

Señor Navarro has several big fields of hemp which, like those of his neighbors, is in the finest possible shape. He employs Japanese and native labor. There are few mountain people to be found in this vicinity.

Further S. one finds the plantation of Captain Juan B. Urquiza and Señor Manuel Echevarria, lying on eihter side of the Tagulaya river, one of the largest and finest streams in the district. These *hacenderos* are both Spaniards, and have wives from among their own country women, who seem to live happily in this out-of-the-way corner of the globe.

Señor Urquiza, or Captain Bachi as he is universally known throughout the district,

is the oldest Spanish planter in the district, and has quite a history. He first visited Davao about 25 yrs. ago, as master of a coasting vessel, and traded all around the coast of Mindanao for many years.

When the Americans first went to Zamboanga Captain Bachi was their pilot, and he afterward took a transport with troops into Cotabato on their first visit.

In 1882 Captain Bachi secured by purchase 270 *hectares* of land, bounded by the gulf and the Matay, Sibulan, and Tagulaya rivers. This tract he has lived on from time to time and planted, but did not take up his permanent residence there until 1900, when he took to himself a wife and quit the sea. Now he has a comfortable residence on the beach, where he and his charming wife entertain most hospitably. Captain Bachi says that the secret of good health is for the planter to clear away the forest about his house, to let in the sunlight and good air. The *hacienda* now contains about 80,000 hemp plants, a portion of which are bearing. There is also a fair sized cocoanut grove. At one time Captain Bachi had 3,000 cacao trees growing, which yielded enough in 3 yrs. to pay all expenses of planting and care. In 5 yrs.' time they netted ₱9,000 with very little labor. The fire wiped them out during insurrection. Captain Bachi is now preparing to plant a still greater number than before. The cost of seed and planting he figures on at about ₱40, per *hectare*. During the past season old trees still standing, which have not had any care for 10 yrs. have borne more fruit, he says, than cultivated trees in this vicinity have ever been known to bear. The new plantation will be on high ground.

Señor Manuel Echevarria's plantation is on the N. side of the Tagulaya, and is well watered and on rich soil. He has about 25,000 hemp, much of which is now bearing. Señor Echevarria is vice-president of the planters' association and one of its most energetic and enterprising members. Having lived in the United States, he speaks English fluently, and understands American methods and ideas. His plantation is well kept, and his home comfortable. He employs Bagobo and Japanese labor.

JOLO PLANTING COMPANY

Adjoining to the Mindanao States Company plantation on the W. just across the government trail and on the N. bank of the Padada River is the Jolo Planting Company plantation, managed by A. C. McClellan, one of the best hustlers in the Davao District. Although the location was not made until May 1895, Manager McClellan has already cleared and fenced (stockade) 100 acres and most of it very heavy clearing, and set out 16,000 plants in October and November of the same year. He has now 30,000 more seeds ready to plant in April. He is interplanting cocoanuts.

Profiting by the experience of his neighbor, Mr. Cook, Manager McClellan made friends with the Tagacaolos and Calagans—mountain tribes—and induced them to settle in a neat village which he built on the place. Lately he has added a number of Bilan tribesmen who, while the more timid people, are physically more capable than their neighbors, and are natural agriculturists. Today an average of 50 men per day turn out for work. There are only ten men on the plantation who work steadily. The others must have time for hunting and trading in the mountains. The working hours are from daylight until dark, with 1½ hrs.' nooning.

Manager McClellan says that his outfit of tools for working the place cost ₱300, and he rarely carries a stock of goods with more than ₱300 in his store. The people prefer to take their pay in trade, so that their actual daily wage amounts really to about 30 *centavos*. They refuse to accept money under any circumstances.

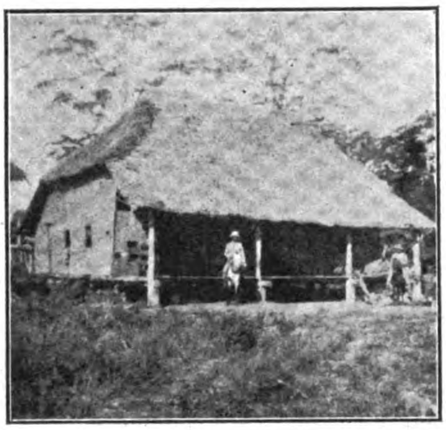
To accomplish what he has Manager McClellan has employed 5,620 days work, costing actually ₱1,450.09. He figures that it cost ₱150 to clear, fence and plant one *hectare* (2½ acres) containing 1,000 hemp plants and ₱2 per month to care for each 1,000 plants during the first year; after that much less. The laborers live better and dress better than ever before. Their village is clean and attractive. They receive free medical treatment, and protection against tribal enemies.

Incidentally Manager McClellan has erected for himself a comfortable plantation house with commodious outbuildings, owns some good ponies and a team of oxen, and lives better than the average farmer in the United States. He says he has never been 5 ms. from his house in any direction. He does not carry firearms, although his workmen all go heavily armed, and are about as wild-looking bunch of savages as one can imagine. The wild people are peace-loving despite their looks; they do not steal, and always pay their debts. They raise their own fruits and camotes and once a year go into the mountains to buy rice from the Bilans.

The Jolo Planting Company is incorporated with headquarters in Jolo. It has taken up 25,000 acres of land, holding it as yet only by squatters' rights, but is able to make its title good.

THE DIGAS ESTATE

The plantation of this company, managed by Mr. Sawyer is one of the finest properties on the coast. It is located at the mouth of the Digas River, about 40 ms. S. of Davao. Recently the location and company's rights were purchased by Captain Pfort, manager of the South Philippine Steamship Company and master of the steamer *Borneo*, owned by that company and trading around the Coast of Mindanao and throughout the Sulu Archipelago.



DIGAS ESTATE PLANTATION HOUSE, DIGAS VALLEY

The Digas Estate, as the plantation will be known in the future, comprises a large tract of land on the N. bank of the Digas River, containing in the neighborhood of 2,500 acres. The original site was selected by Mr. Wilcox, present manager of the Cooksville Plantation, and some clearing and planting was done by him. Manager Staples, who recently sold his interest, has planted 15,000 hemp and has everything ready to plant 20,000 more. He recently purchased from Filipinos a fine clearing on his site containing 8,000 hemp plants that will be ready to strip next fall.

The timber in this vicinity is very heavy, but the soil is correspondingly rich. The largest logs, are, however, of soft wood which crumbles away within a few months after it has been felled. In the same vicinity molave logs may be found measuring 3′ in diameter. The jungle is rich in palma brava, bejuco (rattan), and nipa.

The plantation house is one of the neatest and best arranged on the coast. It sets back about 300 yds. from the beach. A long strip of beach land is now being prepared for cocoanuts. There is room for 50,000 trees, and Manager Sawyer already has 11,000 sprouting in his nursery. Regular stockade fencing is now in use, but 5 ms. of woven-wire fencing have been ordered from the United States and will be in place before the end of the year. This style of fencing costs ₱2 per rod laid down at Digas.

Captain Pfort is looked upon as a decided acquisition to the district. He has been ship's master and trader through the East Indies for 17 yrs. and has had much experience in Borneo as a planter. He will likely plant on a large scale and carry on an extensive trading business in the Digas Valley.

TAGUN PLANTATION

The Tagun Plantation Company, of which L. L. Day, treasurer of the District of Davao, is the head, located just about 1 yr. ago on the Tagun River, about 6 ms. from its mouth and 25 ms. N. of Davao. The Tagun is the largest river flowing into the Gulf of Davao, and is navigable for 15 ms. from its mouth by launches drawing not more than 4′. This particular section of the Gulf Region is new and promising. The land, sloping back from the river on either side, is exceedingly rich, and the jungle-growth easy to clear away. The rainfall is steady and good throughout the year, and during 7 mos. is really quite heavy. When the rain fails there is a very heavy dew which nightly drenches all vegetation.

G. W. Sickles is a considerable stockholder in and resident manager of the Tagun Plantation. The property is located across three points of land formed by bends in the river. Forty acres were cleared up to January 1st, and 10,000 hemp plants had been set out. The 6-mos.-old hemp is as forward as any in the district. As the Spring of the year is the best time for clearing and burning, it is likely that the present acreage will be more than doubled by August 1st.

There is no good cocoanut soil in the river bottom, but Messrs. Day and Sickles have selected a site at the mouth of the Tagun where they expect to plant a large acreage of these trees during the next 2 yrs.

Massie Tague's Plantation.—Just across the river from the Tagun Plantation is located the *hacienda* of Massie Tague, an American who has a good clearing and 8,000 plants growing. He has associated with him a Mr. Schopley, of Manila.

There are a number of Moros in the Tagun Region, who make good plantation hands. This is also the country of the Mandayans (river people), one of the largest tribes in the E. part of Mindanao.

THE SERRACHE HACIENDA

Just S. of the village of Asturiga, where the mountains first come down to the sea, is the plantation of Señor Luis Serrache, who has ventured farther into the wilderness than his Spanish brethren. He staked out his place there 3 yrs. ago in a cocoanut grove of 300 trees, all in bearing, which he purchased from the Bogobos. He did not have much capital, but the heart of a pioneer beat within his breast, and the hardships he endured and the labor he did have yielded a good harvest. Today he has a fine-looking place. About 9,000 hemp plants are coming into bearing, and as many more are in the nursery ready to be set out at the proper planting season. He has already planted 500 new cocoanuts and has as many more sprouted and ready to set out.

Señor Serrache is just within the center of the Bogobo country. Between his *hacienda* and Asturiga the Bogobos—all small planters—have about 177,000 hemp plants growing, many of them already yielding fiber. Some of the clearings in the vicinity were unusually heavy and the work must have cost the Bogobos, with their primitive tools, great labor. Three years ago these people were so timid that they fled upon the approach of strangers, lived in the mountains, and existed principally upon the fruits of the chase.

Señor Serrache is now building on his place a substantial house, in which dressed lumber and galvanized iron enter largely into the construction.

District of Sulu

Pearling Industry and Fishing for Sea Foods, Combined with Agriculture and Commerce, are Bringing this District into Prominence as an Important Business Center

CAPT. JAMES H. REEVES, 14TH U. S. CAV.
Act. Governor of the District of Sulu

Major H. L. Scott, 14th Cavalry, was appointed Governor of the District of Sulu upon the organization of the District, and has displayed great sense and judgment, not only in maintaining order, but in encouraging the natives to develop their industries, especially agriculture. Under his advice much systematic planting of hemp, cocoanuts, cacao, and other products has been accomplished, and, despite the occasional disturbances in Jolo, there has been steady agricultural progress. The ground is exceedingly rich, and well-watered, and affords excellent inducements to the agriculturalist.

The Moro population is only a fraction of what the island will easily carry, and it is extremely probable that the land will easily carry, and it is extremely probable that the land laws will be extended to this island in the immediate future, and unoccupied territory opened up for settlement. Such a course, under proper supervision, will, it is believed, tend much to the development of the island and the maintenance of order.

ACTING GOVERNOR REEVES

James H. Reeves, captain, 14th U. S. Cavalry, was born in Centre, Cherokee County, Alabama, September 20th, 1870. He was appointed to West Point Military Academy in 1888, entering September 1st of that year and graduating June 11th, 1892. He was appointed second lieutenant in the 4th U. S. Cavalry.

He graduated from the Infantry and Cavalry School in 1897; transferred to the 6th Cavalry June 24th, 1897; was in the Santiago campaign as aide-de-camp to Major-General Joseph Wheeler, U. S. Volunteers; was promoted first lieutenant and transferred to the 2d Cavalry November 10th, 1898; went to Cuba with the 2d Cavalry in January, 1899; was appointed aide-de-camp to General James H. Wilson (Wilmington, Delaware), commanding the Department of Matanzas and Santa Clara, in April, 1900, accompanying him to China during the Boxer troubles in that year; was attached to headquarters of Major-General Adna Chaffee (now lieutenant-general retired), November 1st, 1900; was appointed military attaché of the United States Legation at Peking, December 18th, 1900, visiting Japan, Korea, and Manchuria in the discharge of duties; was promoted captain February 1st, 1901, and assigned to the 14th Cavalry; was relieved from duty as attaché at Peking in July, 1902, and joined his regiment at Fort Grant, Arizona; left the United States for the Philippines with his regiment September 5th, 1903; served at Jolo on military duty till October 11th, 1905, on which date he was detailed as district secretary of the Sulu District, and presidente of the Municipality of Jolo.

Captain Reeves has been acting district governor since January 1st of the present year.

JOLO, THE DISTRICT CAPITAL

Jolo, the capital of the Sulu Archipelago and probably the most southerly port in the Philippine Islands, is a distinctly interesting place. It is commercially important, possesses a good harbor, is the headquarters of the pearling industry, and is so fertile and beautiful that it is often referred to as the *Garden Spot* of the Southern Islands. The Moro inhabitants have ever been a turbulent lot, holding a sort of off-hand alliance to the sultan, and preying upon each other; but they are fast learning that American control means peace and security. It is believed that now that the last of the bad element has been eliminated, and the life of the foreigner made secure, the Island of Jolo will become one of the most productive in the Philippines.

The commercial population of Jolo now comprises about two score Chinese, a few Americans, Spaniards, and Filipinos, and several British Indian and Ceylonese merchants. There are no Moros in business. They are either agriculturists or fishermen, when they do work. The exports of the island include hemp of first grade quality, copra, shells, tortoise shells, manufactured rope, and a great variety of sea food for the Chinese merchants. Little can be learned concerning the value of pearls marketed, for several reasons set forth in an article of other pages. However, it is considerable.

IMPORTS.—Perhaps the most important imports are cotton textiles, from England and Germany; rice from Bangkok and Saigon; sugar from Java and Hongkong; English and German cotton yarn, which is dyed and woven into native cloth; and brassware from China. Other imports are enamelled wrought-iron ware from Austria; kerosene; coffee; tea; bamboo; gumbo; lumber and flour. During the year 1905 the total value of imports amounted to ₱276,730.

RICE AND OTHER FOOD PRODUCTS.—The native rice output is only sufficient to last about 3 mos. of the year. There is plenty of splendid ground where highland rice might be grown at good profit, but the conditions of the country have been so unsettled that no person has cared to undertake the job. A food staple of the country is tapioca, which grows almost wild. It is said to be very hard upon the soil. Camotes grow everywhere, and form one of the principal foods. The rainfall upon the island is very reliable, and droughts have never been known. There are no violent storms. The rain usually falls in gentle showers, at midday and midnight, throughout the year. The nights are cool and pleasant and the heat of the day never unbearable.

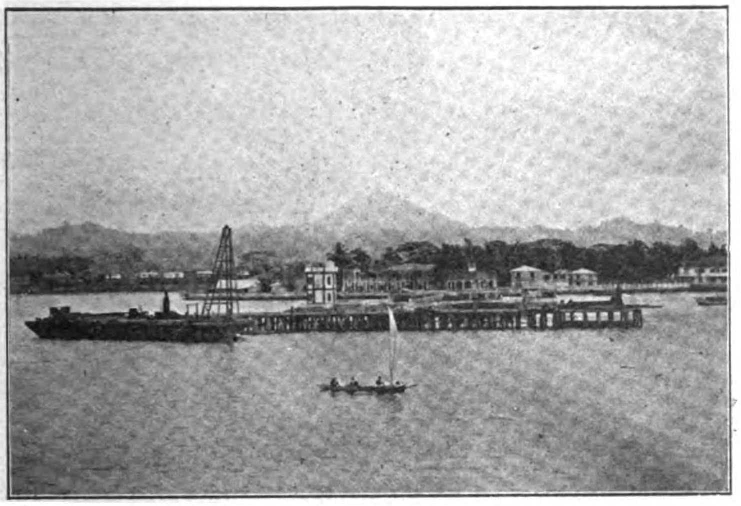
CULTIVATION OF HEMP.—Security of life and property will greatly promote the cultivation of hemp, which ought to be the staple product of the island. The surface of the island is usually level or rolling prairie, with a few considerable elevations. The land is quite free from jungle in most parts, and of the best for the cultivation of hemp. The quality of *abacá* exported brings a good market price, and compares favorably with Samar and Leyte fiber. At the present time the shipments amount to about 1,000 piculs per month—not a tithe of what they ought to be. There are no large plantations, but only small lots of hemp scattered over the islands. Some of it also comes in from the surrounding islands, which are also rich in agricultural wealth.

COPRA TRADE.—The coprat rade at the present time is inconsiderable, only about 150 piculs per month being shipped. There is, however, a very large acreage available for cocoanut culture, and the success of groves already in bearing proves that it is a paying business. The other islands of the archipelago are all suitable for cocoanut culture, and, no doubt, at some future day will furnish Jolo with material for very large copra shipments.

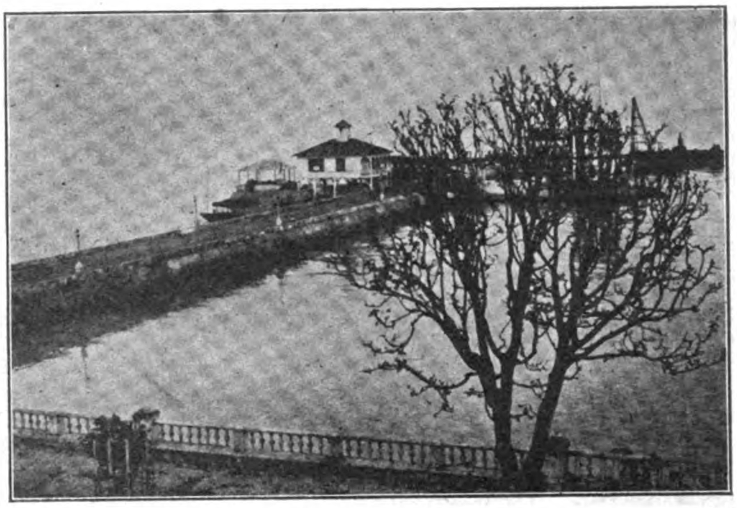
RICH IN SEA FOOD.—The Sulu Archipelago is perhaps richer in sea food than any other section of the Philippines. There are many

By permission of Encinas, Zamboanga

CITY OF JOLO, LOOKING SOUTH FROM THE LIGHTHOUSE



NEW PIER FROM THE HARBOR



PIER FROM THE CUSTOM HOUSE

varieties of marketable fish, but at the present only a local market for them. Some far-sighted business men are looking forward to the day when the markets of Manila and other northern cities will be supplied with fish from Jolo. There is a fine opening along this line for a man with capital and a knowledge of the business. Already valuable shipments are made monthly to Chinese markets of the following sea produce:—Beche-de-mer, sharks' fins, sea weeds, and sea horses,—all Chinese delicacies.

LIVESTOCK.—Formerly, Jolo was a noted cattle and horse market. Rinderpest, surra, and war, however, decimated the herds, and, at one time, nearly annihilated them. Now this important industry is being rebuilt. Señores Mariano de Leon and de la Cruz are the leading cattle traders. Their monthly shipments of beef cattle to Manila reach more than 100 heads, and they hope to more than double this number within another year. There are fine grazing lands all over the island. Jolo ponies are famous throughout the Philippines, Borneo, and the Straits Settlements for their speed, and many find their way to the race courses in Manila.

JOLO'S FINE HARBOR

The City of Jolo lays claim to one of the safest harbors in the Moro Province, and one of the most central. The harbor itself is crescent-shape, faces the NW., and is protected on the side by a chain of low-lying islands. No pilot is needed there, and the water is so deep that the largest ships may be loaded and discharged at all times and with great despatch. There is also plenty of excellent water to be had for all comers. There are no currents in the harbor

THE WHARF.—A T-shaped wharf has recently been constructed to replace the old one. The work was done by the Atlantic, Gulf and Pacific Company, Inc., of New York City and Manila, under the direction of Captain McCoy, provincial engineer, in whose official capacity the plans were prepared with the valuable assistance of Assistant Engineer Vance.

It is claimed by the most enthusiastic supporters of Jolo that the port is more central than any other in the province in its relation to Singapore, Borneo, Java, etc., and because of its safety and facilities for handling cargo ought to become the principal trans-shipment port of the southern islands. It already has trade relations established with Cotabato and Davao, in Mindanao, and with Singapore, Borneo, and Hongkong. The North German Lloyds mail steamer *Borneo*, from Hongkong to British North Borneo, is a regular caller there. Two Singapore vessels touch there regularly, as well as two from Manila, the southern island trader *Borneo*, and all of the transports.

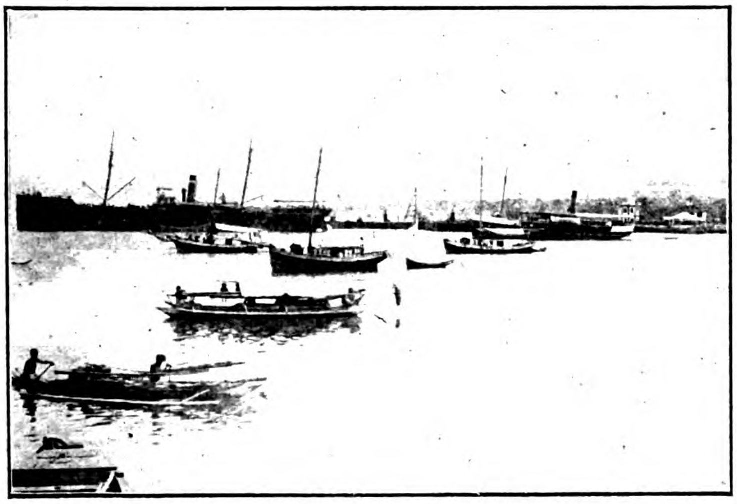
There is a regularly established trade between Jolo and the other islands of the Sulu Archipelago that is carefully fostered by the business men of Jolo In the fleet are several *sapits* or sloops, and a large number of smaller vessels. The freight rates on these ships are low, and they all handle a large volume of traffic.

OPEN PORTS.—There are open ports at Cagayan de Jolo and at Bungao, in Tawi-Tawi Group to the S. At Balimbing, Tawi-Tawi, a shipbuilding industry has long been established, which is today quite valuable. Nearly all of the larger craft and pearling boats in the district are built here. Sometimes there are as many as 20 boats under construction at one time. There is fine hard wood timber to be had in that vicinity, and the art of boatbuilding has been handed down through several generations from father to son.

COMMERCIAL JOLO

The business men of Jolo are few in number but are notably enterprising. Since the protection of the American Government has made it possible for foreigners to carry on business there two commercial houses have been organized to carry on the export and import trade. The first in the field was that of Hernandez & Co., of which Mr. J. H. S. Terrajon is president. This firm is agent for Messrs. Holliday, Wise & Co., of Manila, and Compañía Maritima. In addition to carrying on a large export and import business, the firm owns nine *balandras* engaged in the pearling industry, all of them equipped with the most modern gear for deep-sea diving and pearl fishing. Mr. Hernandez Ison is a partner in the business and manager. Mr. Stephen Jurika, an American, is also a large stockholder.

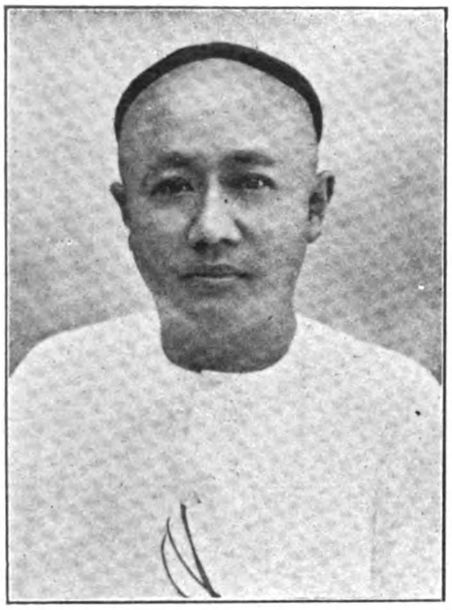
Jolo Trading Company.—This company, which was organized in 1903 with considerable capital, has for its president Captain Tiana, a wealthy and highly respected Chinese merchant, who has resided in Jolo for 30 yrs. He has associated with him Mr. Tan Dico and others o. his own countrymen. The company imports goods from every part of the world. It handles the bulk of the hemp in the District of Sulu, and carries on an extensive trade in every part of the Moro Province. The agents of the Jolo Trading Company are Messrs. Behn, Meyer & Co., Ltd., at Singapore; the Matute Hermanos and Palanca, at Manila, and the South Philippine Steamship Company.



HARBOR FROM THE CHINESE PIER

THE WATERFRONT

Photos by Aeronaut Gibbs



SR. RAMON HERNANDEZ ISON,

Of the firm of Hernandez & Co., Jolo

Captain Tiana is progressive. He encourages the Moros to plant and to fish, and gives financial assistance to all who are honest and willing to do. The following list of average monthly exports from Jolo was compiled in the office of the Jolo Trading Company for THE FAR EASTERN REVIEW:—

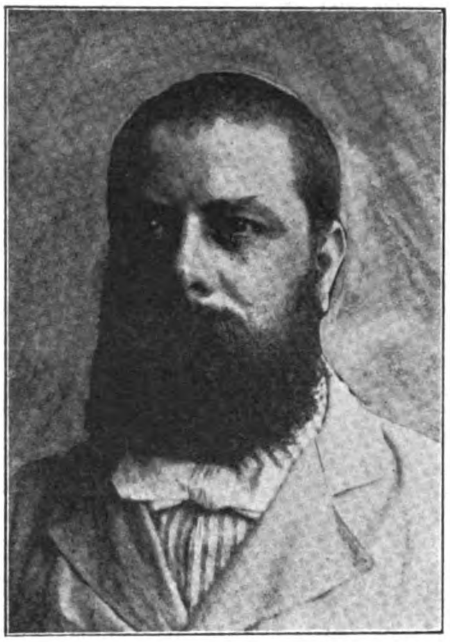
	PICULS		
HEMP			
Generally exported to Manila	1000@ ₱	21	₱21,000
PEARL SHELLS			
Generally exptd. to Singapore	150@	45	6,750
TREPANG			
(Beche-de-mer) " " "	50@	30	1,500
SHARK FINS " " "	20@	45	900
HEMP ROPE " " "	30@	25	750
CARACOLES " " "	40@	12	480
BLACK SHELLS " " "	10@	8	80
COPRA " " "	500@	7	3,500
SEA WEEDS " " "	40@	4	160
HIDES " " "	10@	20	200
CACAO " " "	10@	50	500
TORTOISE SHELL " " "	1½@	1800	2,700
SEA HORSES " " "	2[5@		240
			₱37,760

Note.—If the value of pearls taken is estimated on the basis suggested by Captain Tiana, it will bring the total up to ₱58,760 per month.

Products of the Sea.—Caracoles, or sea-snail shells, are used in making buttons. The industry is new in the Sulu Archipelago, shipments having been made only during the last few months. The shells are composed of a substance resembling mother-of-pearl which is considerably softer than the latter and more easily worked. It is readily made into buttons, and there is now a factory in Manila, La Concha, which utilizes shells of a similar quality. The caracole industry is one which can readily be developed in the Sulu Sea and which promises large returns to the investor. At the present time caracole is nothing more than a by-product.

Trepang, shark-fins, seaweed and sea-horses are foods highly prized by the Chinese and find a ready market in Singapore.

Hemp Export.—In comparison with the amount of land available for the production of hemp on Jolo Island, the export of that staple is insignificant. The quality of the fiber produced is very high and there are tens of thousands of acres now lying idle that can be used. It is only a question of time. The Schuck Estate, comprising 2,500 acres of magnificent land immediately adjoining the City of Jolo, is ready for cultivation. It is only the question of a few years more and the Island of Jolo will become noted for its varied and valuable produce. The present system of government not only eliminates the ancient pirate, but puts confidence into the modern business man.



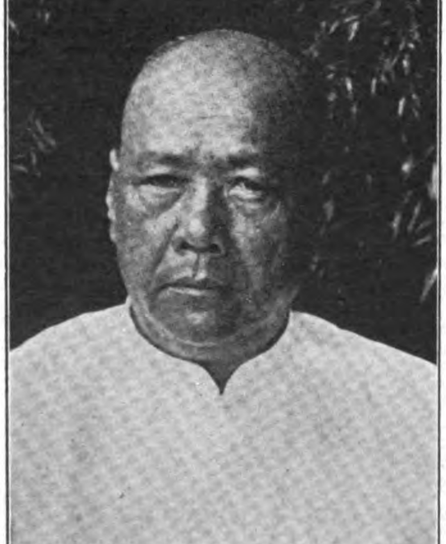
SR. J. H. S. TERRAJON,

Of Hernandez & Co., Jolo, who has large interests in the Pearling Industry

DISTRICT OF SULU SECOND IN COMMERCIAL IMPORTANCE

In the work of the Moro Province, where the desire is to accomplish material results in bringing the wild people in touch with civilization and encourage them to work and to preserve order; to afford the necessary protection to them, and to the white residents and Filipinos; to aid the planters in obtaining and controling their labor; to facilitate the increase of exports from the province; to establish a form of government which shall be far-reaching and paternal in its character as regards the uncivilized people, and to be of material assistance to the white and other civilized residents—especially in commercial and agricultural pursuits—the examples of different forms of tropical government so near at hand are a great help.

Very fortunately the waterways furnish the most excellent routes for transportation within the Moro Province. In order to cheapen the cost of transportation, the provincial government subsidizes a small steamer which makes regular trips to all parts of the province and charges a comparatively low tariff, thus aiding all in a most material way. The government officials encourage the natives to get out jungle and other produce, and on a recent trip of the subsidized steamer *Borneo* to Davao she brought back to Zamboanga 40 tons of jungle produce. In order to enable the natives to have a ready sale for the products of their labor, markets have been established and have been very successful, the most remunerative being the so-called Moro exchanges in the District of Zamboanga. The market at Malabang has also been particularly successful. These do a strictly cash business, the Moro or Subano receiving actual money in payment for his produce. They have been fully described elsewhere in this issue.



CAPTAIN TIANA,

A leading merchant of Jolo

MR. STEPHEN JURIKA,

Of the firm of Hernandez & Co., Jolo

Appropriation has been made for the establishment of a Moro market in the City of Jolo. There the acting district governor held a meeting of the chiefs, and persuaded them to agree to report at once all cases of murders, and bring in the murderers for trial before our courts; also to take measures to prevent thieving, and to establish markets on the order of the one at Zamboanga.

Very much of the hardest work that officials have before them is to keep these savage Moros alive and win them over to the walks of peace, and thus enable the population to increase; for, while it is easy enough to kill them, and they sometimes force measures to such an issue, the native is capable of becoming a useful citizen and a good laborer, as shown by the successful administration in other tropical countries referred to elsewhere in these columns, and by our own experience.

It will be necessary for the government to use great care to allot, to those natives desiring it, land in severality, and to prevent their being deprived by others of those lands. The best land law would be one that would leave to the state the titles to all lands and would provide for leases under conditions requiring constant cultivation or improvement, and permitting the state to take back the lands when such conditions are not fulfilled.

For the last few months a record has been kept, as far as practicable, of all exports from the province and it shows that the District of Sulu is second in commercial importance in the province, while about nine-tenths of the business is done at the Port of Jolo. The record is not complete, as reports from several towns have not been received, but a gratifying result is shown in the following table:—

NAME	DISTRICT OF ZAMBOANGA						DISTRICT OF DAVAO					DISTRICT OF LANAO			DISTRICT OF SULU				TOTAL
	Zamboanga	Isabela de Basilan	Dapitan	Margosa Tubig	Dipolong	Lubungan	Davao	Caraga	Catel	Baganga	Mati	Cotabato	Iligan	Malabang	Joló	Jurata	Sitankay	Bongao	
Hemp	₱1,049.00	₱	₱ 24,011.11	₱	₱59,643.83	₱23,881.32	₱160,410.00	₱ 16,754 83	₱4,362.53	₱	₱1,319.80	₱ 33.00	₱ 6,487.95	₱	₱21,262 00	₱	₱	₱	₱319,215.37
Copra	31,662.24		377.01		1,208.94		591.00				29.31		965.50		8.048 38	1,54			44,429.26
Coffee												13,762 50	518.00	24,779 10					39,059.60
Wax	1,959.20			14 00	176.31		80.00				254.53	1,240.00		757 50					4,481.54
Lumber	250.00	47.50																	297.50
Bagoa				144.00															144.00
Peipiang				9.00															9 00
Rue				172.00								2,261 62							2,433.62
Bubber	9,314.00			90 00								450.00		693 57	636.68				11,184.25
Gum							6,255.00				4,302.01								10,557.01
Hides	31.60						1 00				25.00	360.00			359 08	6 13		3 00	785.81
Cacao	100.00										26.62	157 50	110 00						394 12
Bilao												13 00							13.00
Palay												30 00							30.00
Horses	250.00											130 00						15.00	395.00
Timber													522.00						522.00
Tobacco													185.00						185 00
Petates													84.00						84.00
Shells, Black	133.70														292.26			22.00	447 96
„ Dead															102.56				102.56
„ Pearl	2,686.26														13,194.90	28.50		190.00	16,099.66
„ Snail	455.00														4,596.74			355.00	5,406.74
„ Tortoise	1,640.50														664.00			8.00	2,312.50
Rope															1,223.26			8.00	1,231.26
Oysters, dried															311.10				311.10
Provisions															80.00				80.00
Shark fins	358.05														3,379.10	.67		45.00	3,782 82
Soap															36.00				36.00
Seahorse															370.00				370.00
Brass ware	235 70														150 16				385.86
Gum, Copal	3,347.43														1,057.00				4,40 .43
Trepang	18.00														2,503.60	1.40		30.00	2,553 00
Red Yarn															240 00				240.00
Saet	1,208.25														26 00				1,234.25
Back															9 76				9.76
Fish, dried	114.00														247.50				361.50
Shellfish, dried	222 96														55.00				277.9
Poultry	37.50															71 80			109 30
Cocoanut Oil	2,407.75															15.00		30.00	2,422.75
Sea slugs																		32.00	30.00
Snail meat																			32.00
Sheep	6.00																		6.00
Pigs	336.00																		336.00
Lard	280.00																		280.00
Leather	400 00																		400.00
Rattan	1.00																		1.00
Sheet lead	10.32																		10 32
Copper, Old	90.00																		90.00
Miscellaneous																			120.0
Shrimps, salted	366.00			120.00															366.00
	₱58,970 46	₱ 47.50	₱24,388.12	₱ 549.00	₱61,029.08	₱23,881 32	₱167,337.00	₱ 16,754 83	₱4,362.53		₱5,957.27	₱18,437.62	₱ 8,872 45	₱26,230 17	₱ 58,845.00	₱1,670.38		₱ 738.00	₱478,070 81

NOTE:—These figures are for 3 mos. only. They are doubtless inaccurate, as there is no special bureau for collecting this sort of data. Careful observers believe that the total amount for 3 mos. ought to be ₱1,000,000.

SULTAN OF SULU FRIENDLY

In the second annual report of the Governor of the Moro Province, Captain George T. Langhorne, A. D. C. to Major General Wood, provincial secretary and acting governor, has this to say concerning the conditions existing in the District of Sulu (Sulu Archipelago):—

"The district governor, Major H. L. Scott, 14th Cavalry, also the commanding officer of the garrison, has had success in establishing law and order with so unruly a tribe as the Sulus, long known as the boldest of the pirates infesting Malayan seas. All of the natives being of the same tribe and religion, there was no opportunity to play one against the other.

"The customs receipts of Jolo are much greater than those of Zamboanga, and are increasing, while the exports to foreign ports show an increase of 10 per cent over last year. The exports from the Sulu Archipelago to other ports in the Philippines are not reported. By constant effort on the part of the district and other officials the Moros have been induced to engage in agricultural pursuits and to gather produce from the seas and to bring the results of their labor into town, which they can now do since travel is unmolested and slavery and its evil consequences largely suppressed.

"This increase in trade has occurred in spite of two severe campaigns against hostile Moros, the terrible storm in October which wrought great disturbance in Jolo and Siassi, and an unfortunate and miserable famine caused by long drought which has weakened some of the people and forced them to subsist in many places on roots. Advantage was taken of this condition of affairs to endeavor to establish a fixed trade and fish industry, especially at Siassi.

"Headmen of the different sections into which the capital district is divided are gradually learning to assist the district governor and be of greater use to their own people instead of oppressing and robbing them.

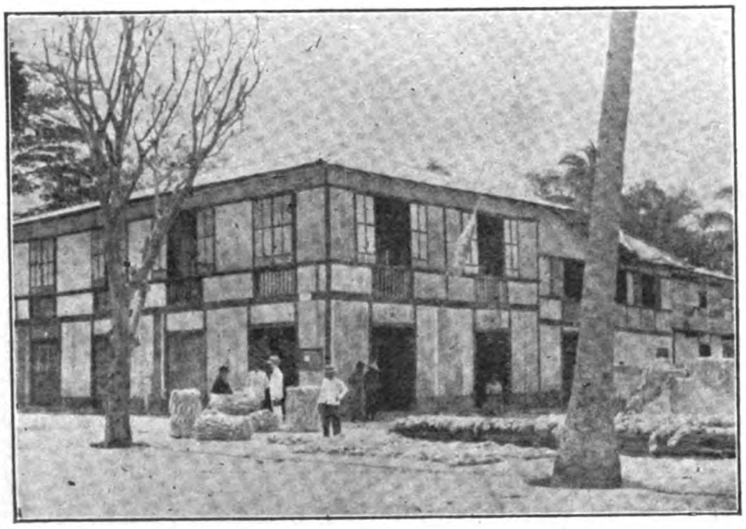
"The efforts of the district governor to encourage the natives to plant hemp, fruit, and cocoanuts have met with considerable success, and the exports of these products is constantly increasing.

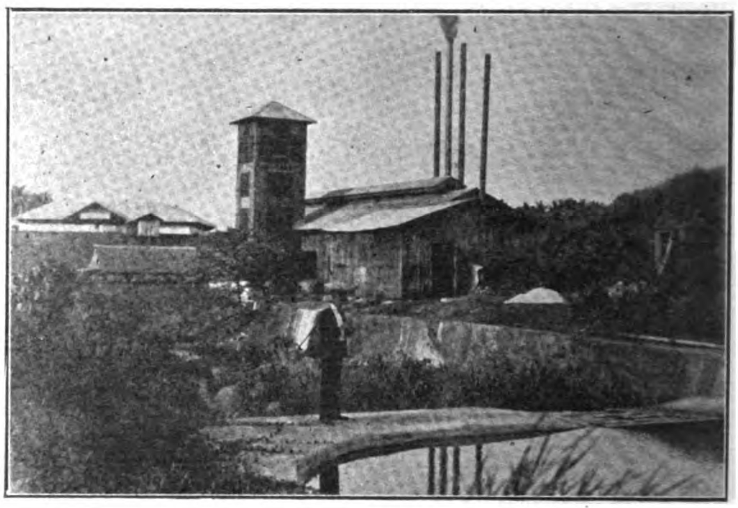
"The town of Jolo has steadily improved and had on June 30th, 1905, a balance in its treasury of ₱7,544.01.

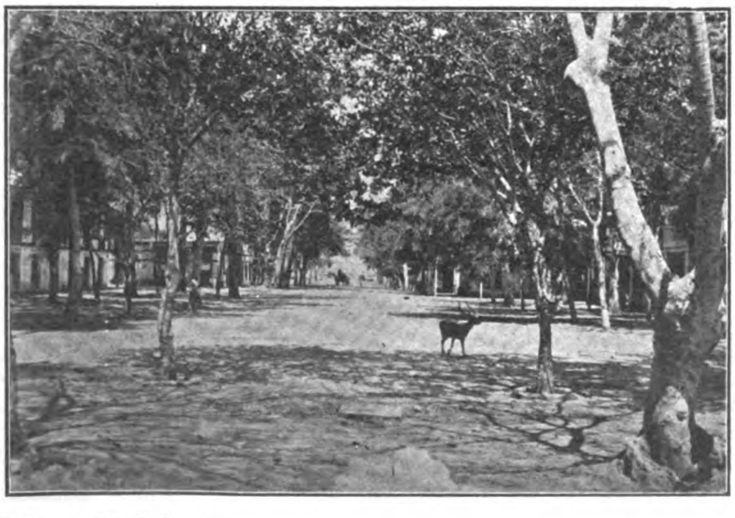
"It is gratifying to note that during the late troubles the sultan and all important chiefs were on the side of the government; that those who made the trouble were renegades from their influence, that they had no important influence, and that the districts of Parang, Pansol and Look took no part. This indicates a greater hold upon the people than has hitherto been obtained.

"Owing to the character of this district for some time to come the governor should also be the commander of the troops, as a one-man power is easily understood and is appreciated by the inhabitants."

OFFICES OF MESSRS. HERNANDEZ & CO. AT JOLO


SHIPMENT OF HEMP IN FRONT OF THE JOLO TRADING COMPANY'S OFFICE

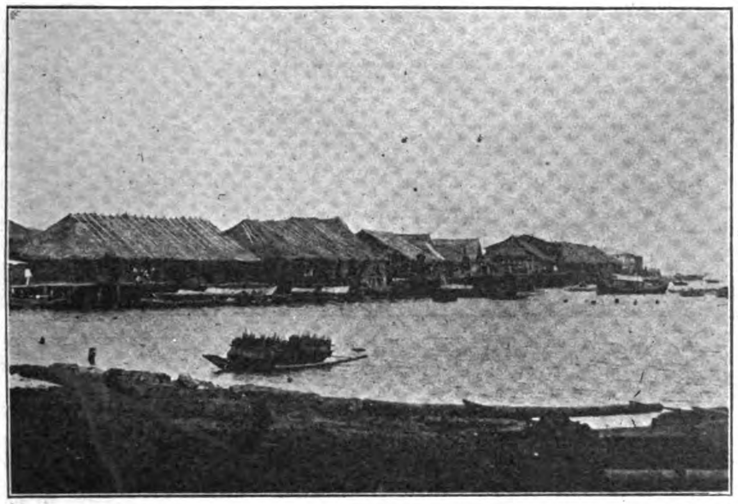

MILITARY ICE PLANT AND PUMPING STATION


PLAZA SCENE AT JOLO

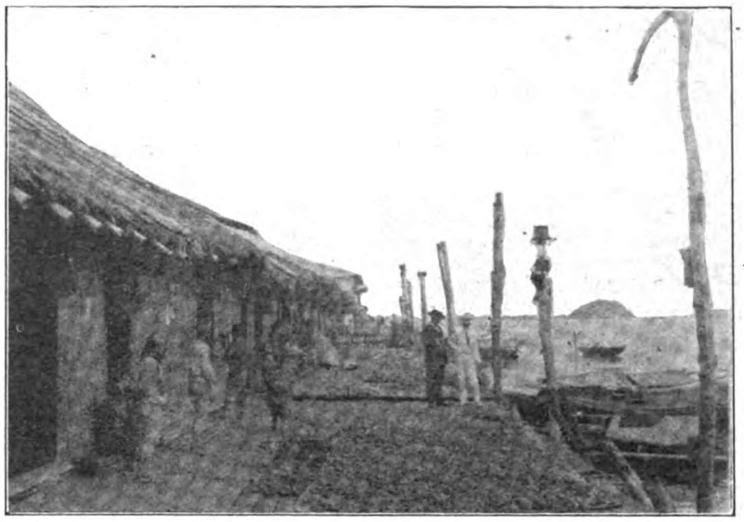
STREET SCENE IN THE NATIVE VILLAGE

Photos by Aeronaut Gibbs.

PEARLING A DANGEROUS AND MYSTERIOUS INDUSTRY AT JOLO



CHINESE PIER, OR PEARLING MARKET, AT JOLO



PEARLING MARKET IS ALSO SPREAD WITH COPRA QUITE OFTEN

Pearling is a mysterious industry. A large amount of capital and thousands of lives are risked each year in delving into ocean depths for the great, rough-shelled bivalve which occasionally contains a pearl worth a king's ransom. Because of the great risks involved and the possible fortune to be gained, the industry has a fascination scarcely to be resisted by those who have once experienced it. Because of the great variety of people who search for pearls, the vast area of the hunting grounds, the centuries-old customs of the Moros, and the special laws covering the industry, no reliable statistics can be obtained that will approximate the profits. The business is therefore mysterious.

Pearling is a game of hazard for high stakes. The pearler must risk capital and human life, must brave the sea and go prepared to fight for his rights, with savage men; and he must pay the taxes and divide the profits with the shrewd trades from Ceylon and Singapore.

Sometimes fortune smiles. Three years ago a single pearl was marketed in the Celebes for ₱36,000. It came from the Sulu Sea. During the following year a pearl brought to Jolo was sold in Singapore for ₱12,000, and last year one sold for ₱9,730. Such finds rarely come to public notice. Shrewd traders are always on hand to snatch them away from the ignorant and fearful divers, and the jewel is first exposed for sale in Paris or London or a Dutch port. Probably the man who places it on the market does not know or care for its history.

Thousands of pearls of less value are found every year, ranging in price from ₱0.50 to ₱1,000. Sometimes a rough-looking pearl, by the process of *skinning*, is reduced to a smaller but more perfect gem, and its value enhanced a hundred fold.

Jolo is one of the foremost pearling ports of the world. The Chinese have large interests in the industry, and there are Americans, Spaniards, Filipinos, Ceylonese, Singalese, and Arabs in it as well. All Moros are interested in pearling and a considerable percentage of the population of the Sulu Archipelago actually gains a livelihood by engaging in this perilous business. It may be said that the entire population of Jolo dabbles in pearls. Curbstone traders are numerous, and they have to offer a tremendous variety of sizes and shapes, colors and kinds. The person who has the least instincts of a trader can not resist the temptation to buy and pit his judgment against that of the seller.

Pearl shells are themselves very valuable in the markets of the world. The mother-of-pearl taken from them commands a high price. It is maintained that the shell alone pays a good profit on a substantial investment, and that the pearls taken from the *catch* are clear profit. At the present time the monthly shipments of shells from Jolo amount to about 150 piculs valued at ₱45 per picul in Jolo. As it does not take more than 30 to 35 pairs of shells to make a picul, a good gathering of shells is extremely profitable.

Nearly all shells contain pearls of more or less value. Captain Tiana, the prominent Chinese merchant who has been many years in the industry, says that in the general run the value of pearls taken will equal the value of shells; that is, not counting on any very valuable pearls, which are rare.

The two leading business houses of Jolo—Hernandez & Co., and the Jolo Trading Company—are both dealers in pearls and shells. Messrs. J. H. S. Terrajon, Stephen Jurika and Ison, the leading members of Hernandez & Co., own a considerable fleet of pearling *balandras* (sloops), and most of their operations are in deep water. The accompanying photographs of their divers at work were taken especially for THE FAR EASTERN REVIEW by Aeronaut Gibbs, and are excellent in detail. Hitherto Filipino divers have been employed, but at the present time Japanese are being tried as an experiment. The Moros do not care to dive in bells.

DESCRIPTION OF THE PEARLING INDUSTRY.—The following facts about the pearling industry in Sulu waters have been compiled by Mr. Herman Schuck, who has resided in Jolo for many years and has made a careful study of the business from every point of view:—

The Moros have three ways of getting the shells out of the sea. One is by actual diving. The diver goes down with only a handkerchief and a piece of rope around his waist; he never goes down quite naked, this being against the custom of his people. Before a diver goes down he always says his prayers and commends his soul to God. This diving is called *maksaap*, ("to risk"), because in the operation the diver is risking his life and also risking the chance of getting a shell. In former days, when shells were plentiful, divers would go down to a depth of 8 to 12 fathoms, but gradually they had to go deeper and deeper, and now-a-days there are divers who will go down 20 fathoms.

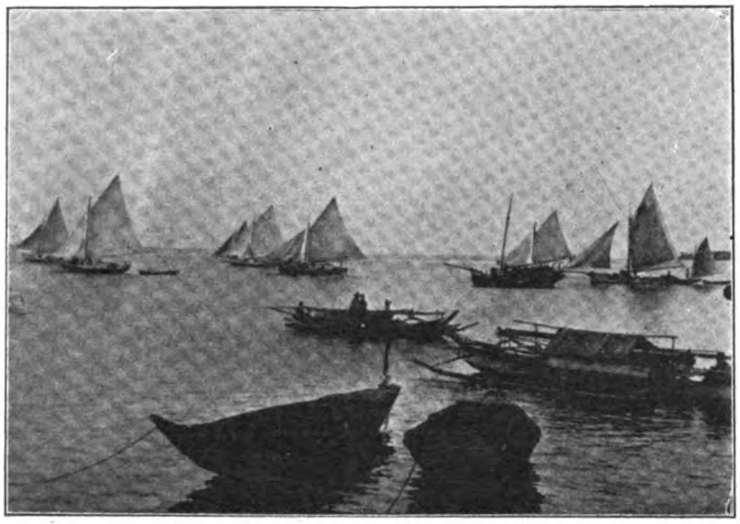
The best divers live in the villages of Parang, called Nunukan and Langan Gitung. There the fathers teach their sons the art of diving, and this is from generation to generation. The second best divers live on the Island of Patian; the third best are the Samals of Sicubun. There are no other divers in the archipelago. If a diver is found in any other place his nativity is generally traced to either of the foregoing habitations. These divers usually do the work in partnership of two, seldom more, and even if either of them should not get a shell during an expedition the proceeds always will be honestly divided.

These divers have good fishing grounds near the villages, but they used to make expeditions to other islands and stay away from their homes for a month or two. These expeditions were made sometimes twice, sometimes three times a year; it depended mostly on the weather. Now-a-days these expeditions are seldom, as there is no security, and the people of Parang and Patian are afraid to leave their homes for any length of time, not knowing what might happen to their unprotected families in their absence. Another reason for this is that the ancient custom of giving the biggest pearls which are found to the sultan has been abused very likely on both sides. The people having learned the value of money and also the price of pearls, think it unjust that the sultan and datus make them give up the pearls at such low prices. The result is that a great many pearls are secretly sold to traders. Again, the Moro never gets the right price for the really good pearl, because if he has shown it to the trader he dares not go away without selling it to him for fear that the trader might betray him to the chief; the only satisfaction the Moro gets is that the pearls are bought for double and three times by the trader than what the sultan or datus would pay him.

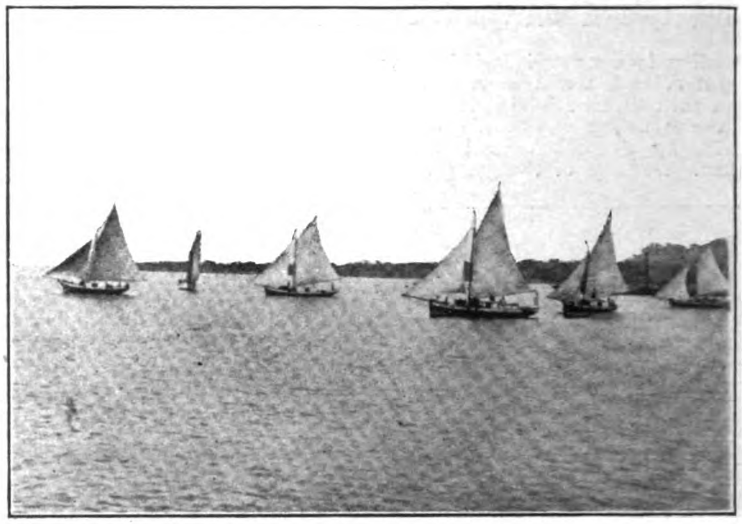
In former times the sultan and the datus made up the loss they sustained by their subjects selling pearls secretly, by fining the divers whom it was reported had sold *datu pearls.* The sultan, for instance, was told that So-and-So had recently become rich, so surely he must have sold a pearl or how did he obtain all these fine things in such a small space of time? At once some of the sultan's messengers were sent out to fine that man ₱2,000. Without trial the man would have to pay, unless the messengers could be bargained with—which was usual—for a lower fine. In case the man and all his friends swore that he had not sold a pearl, then he was condemned to pay the court-fees which were 20 per cent of the amount of the fine. This custom was carried so far that a great many of the Patian divers left and went to different places, some as far as Basilan, at Ubing, where Serip Amina and Serip Agil governed. The Sicubun divers were under the jurisdiction of Datus Kabbi and Jokanain. Parang and Patian were under the sultan. The sultan and datus have no longer the power to control the pearling industry, it having been taken away from them by the American authority.

The second way of fishing for mother-of-pearl shells is with a 5-pronged dredge let down with a rattan. This dredge is called *badja* which signifies plowing; the places where these dredges are used are called *badjaan*. This dredge can only be used where the bed is free from rocks. The diver starts to drop the dredge at the upper end of the current

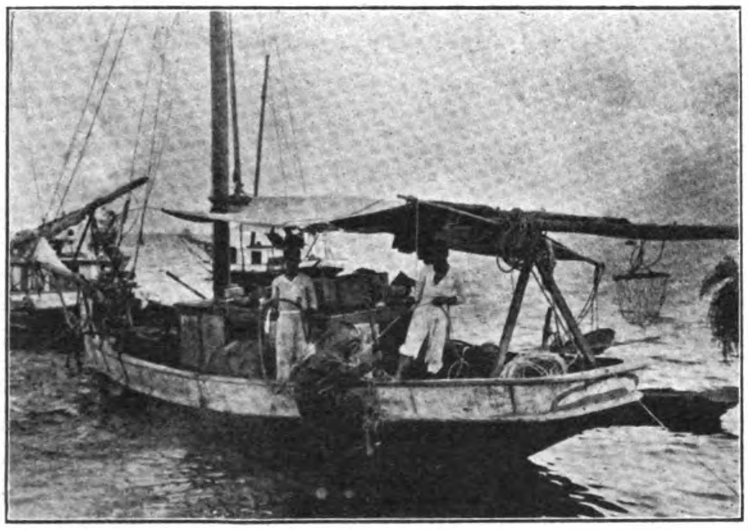
Photos by Aeronaut Gibbs.



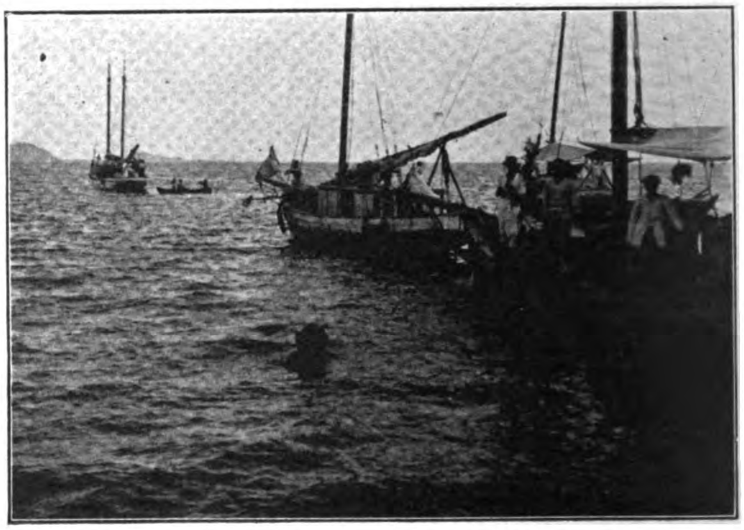
PEARLING FLEET IN THE HARBOR OF JOLO



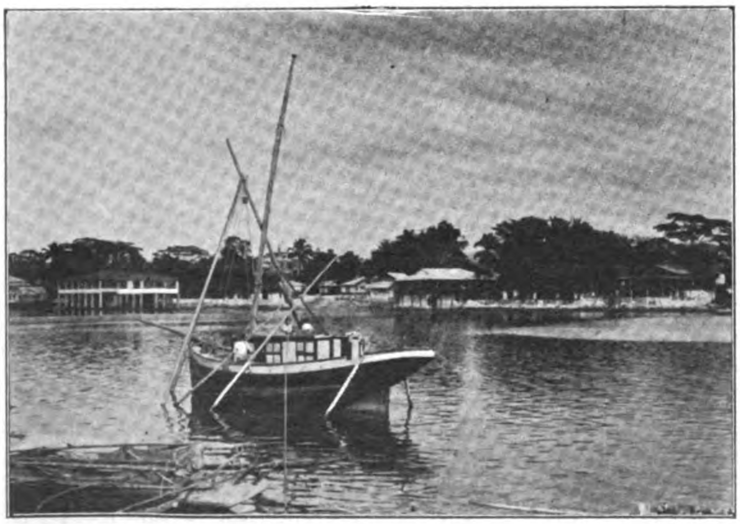
FLEET OFF THE PEARLING GROUNDS



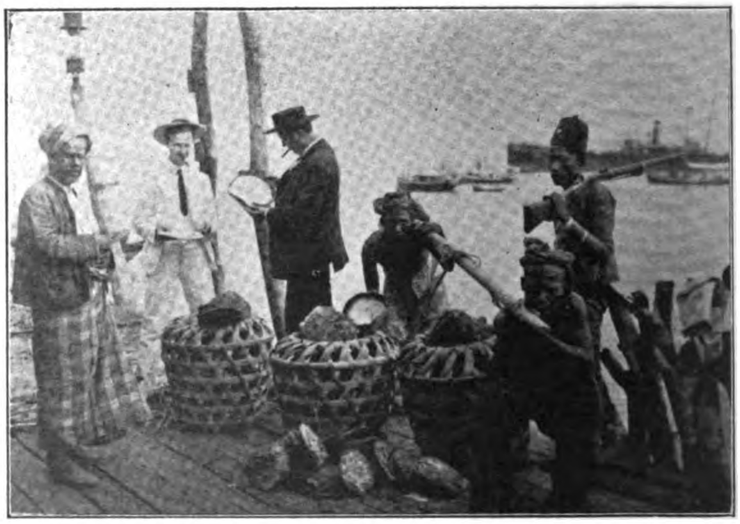
PEARL DIVER GOING DOWN INTO THE WATER AFTER SHELLS



PEARL DIVER COMING UP OUT OF THE WATER



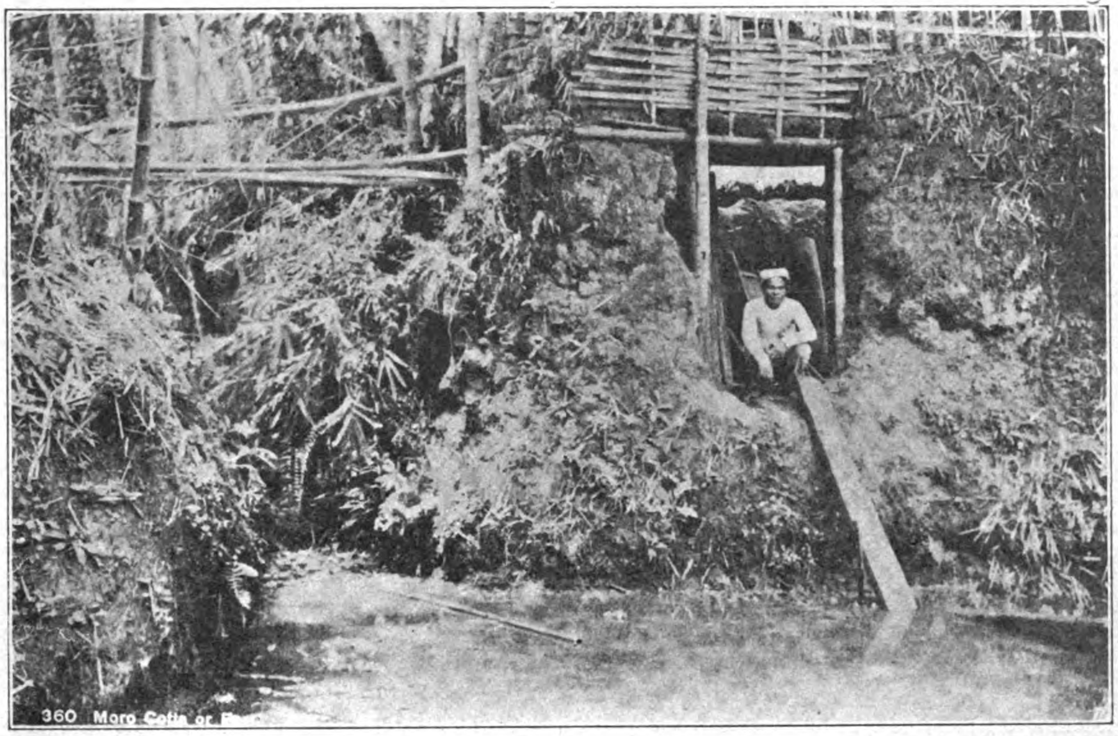
PEARLING BALANDRA, OR SLOOP



ARAB MERCHANT LANDING PEARL SHELLS AT THE MARKET

Photos by Aeronaut Gibbs.

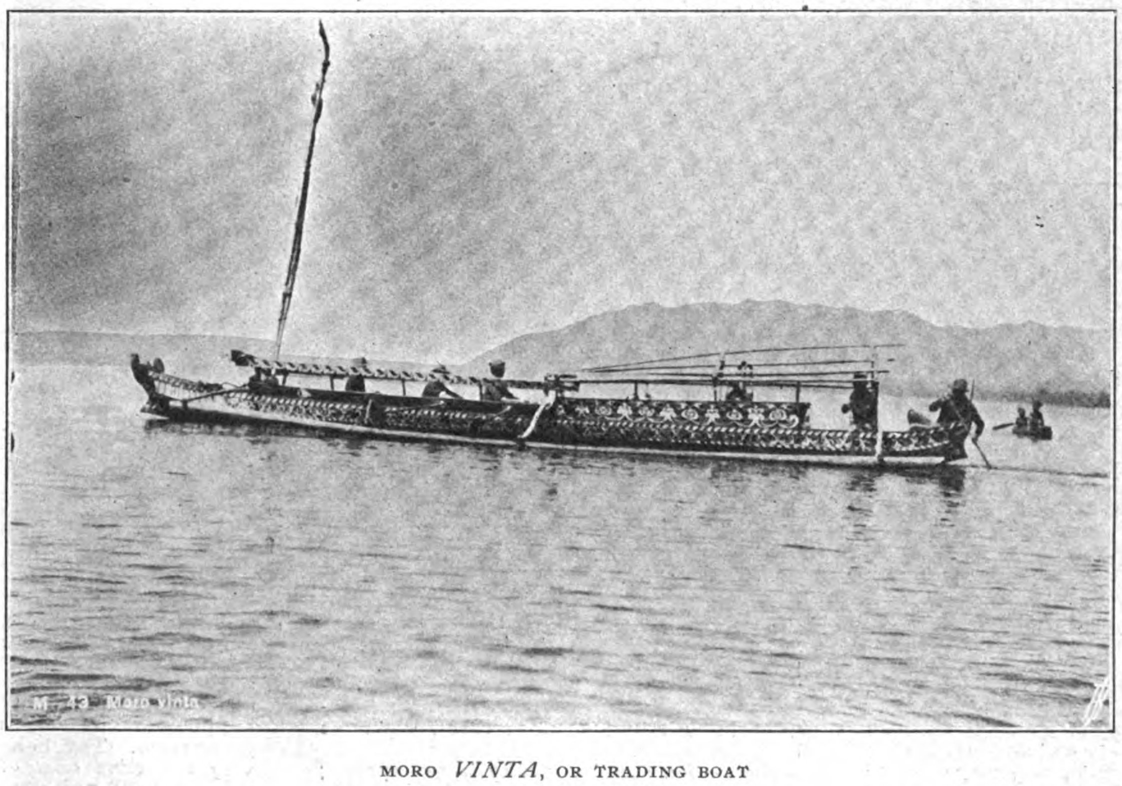
and the latter being very strong it will take the boat right along without any effort of the boatmen, pulling the dredge behind along the bottom. When the dredge catches it is pulled up bringing sometimes a shell, sometimes a stone. When the boat reaches the lower end of the fishing ground it is paddled back



A TYPICAL MORO COTTA

against the current to the upper end, and so it goes, back and forth, until the tide turns. Then the current is not strong enough to pull the dredge.

There are generally two men in a boat, seldom three. The dredging grounds are between 17 to 35 fathoms in depth, and most of them cover a large water area.



MORO *VINTA*, OR TRADING BOAT

The third way of getting the shells is by using a 3-pronged catcher. This is let down by a rattan rope. The Moros call this *mag tung tung* which signifies "to let down." The fishermen can only work at this when the sea is absolutely calm, because the least ripple will prevent them from seeing the shell at the bottom of the sea. Another point is, the sea must be very clear. If storms prevail and the sea is much stirred up, the water remains dirty and the fishermen will not be able to see to the bottom. Sometimes they are able to see bottom down to 100', other time not more than 40 to 50'; so the Moros watch, and if the sea is clear it is immediately known all over the different islands and sometimes 300 to 400 boats are at work in one place.

At the places where the people dredge and use the catcher the shells lie scattered, seldom two together; therefore the diver never goes to these places. On the other hand the people who do not dive never invade the grounds where divers operate, because these areas are generally too rocky for the dredger and too deep for the catcher.

The fishermen who use the diving suit go down wherever they find a place, generally to a depth where the Moros use the dredger and catcher, of 30 fathoms. They hardly ever work because the shells are too scattered and it does not pay them; but there are some dredging grounds where the shells are very thick, and if the sloops once operate in such a place it generally takes years for another growth of shells. If the life of a shell is 12 yrs., which is claimed for it, to be of any value it has to be 7 to 8 yrs. of age.

Most of the fishing places are known by the Moros, the landmarks being handed down from father to son.

Special laws have been made by the Philippine Commission governing the pearling industry. The sultan and his followers have no longer any legal right to collect fines and penalties, but the custom has obtained for so long that the ignorant people still fear the power of the sultan, and have not yet gained sufficient confidence on the American Government to accept its guarantee of protection.

District of Lanao

Stretches Through the Heart of Mindanao and Comprises Thousands of Square Miles of Agricultural and Grazing Lands, and Untold Wealth in Hardwood Forests and Streams, and Waterfalls for Power

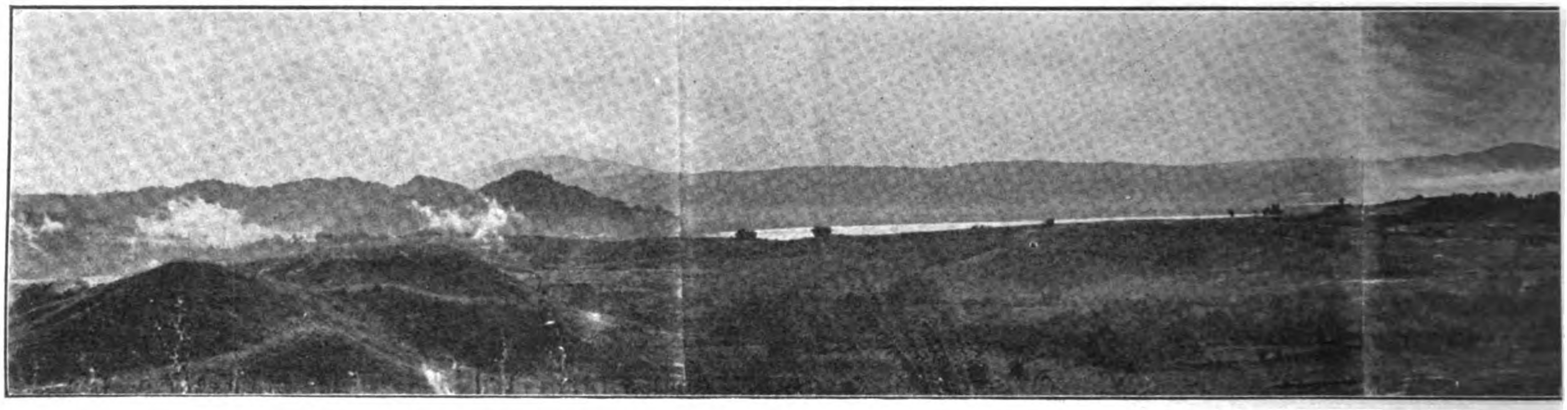
The District of Lanao, which stretches through the heart of Mindanao, from Iligan Bay on the N. to Illana Bay on the S., comprises thousands of square miles of the finest agricultural and grazing lands, untold wealth in hardwood forests and streams, and waterfalls that can develop an almost unlimited amount of power—and a climate that is superb.

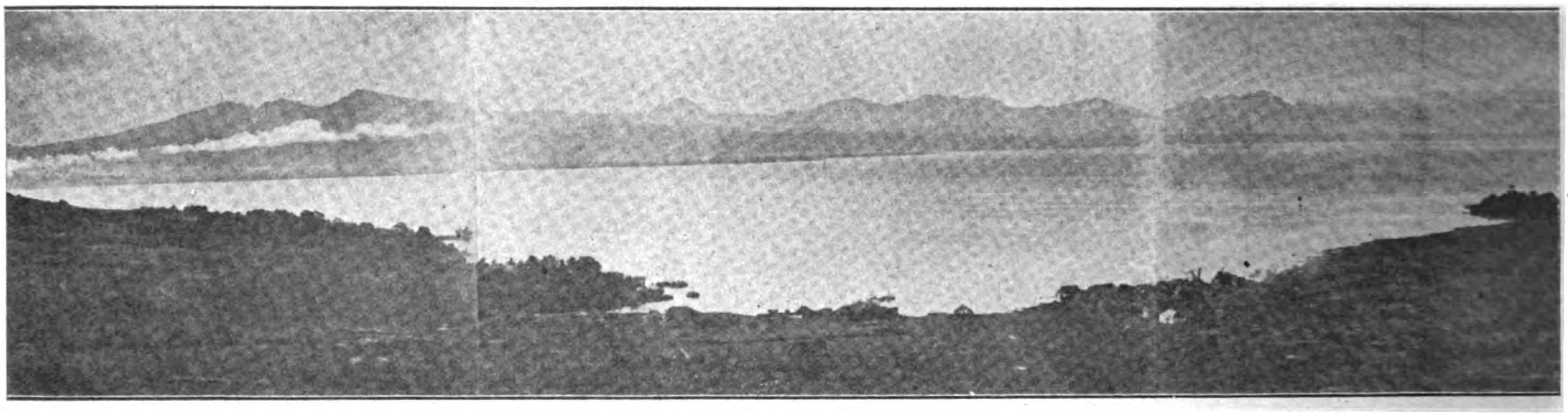
Prior to the occupation of the Lake Lanao region by the United States military authorities, a few years ago, foreign settlement there was impossible because of the opposition of the fierce and warlike Moros who inhabited the region. Since American control has been established, however, the attitude of the Moro towards the white settler has changed to such a degree that the most desirable portions of the district are now considered safe and ready for settlement. The last census report shows that there were about 95,000 Moros in that section. It is not believed that there are so many now. Those who have gone were the slave traders, who, refusing to acknowledge any authority other than brute strength, preyed upon their weaker neighbors. There are some of this class left, but they are known and are under control. There has practically been no hostility in the district for more than a year.

AN ATTRACTIVE REGION.—There is much in the Lanao District to attract the American settler. Vast stretches of virgin land, well watered, lie convenient to commercial centers. Experience has proven that the Moro, under proper management, soon become efficient, peaceable, and reliable laborers. In former years they had to be forced to work on government roads; to-day they are applying for employment in such large numbers that many must be turned away.

Hemp of a superior quality is grown along the N. coast, and finds a ready market in Iligan, the principal town and port of the district. Copra and cacao are staple products of this section. Thousands of acre of land, most advantageously situated for the cultivation of these products, are available today, and fortune awaits the sturdy pioneer who is willing to spend a few years of his life there.

Throughout the interior of the Lanao District coffee, rubber, and gutta percha grow wild and in great luxuriance. The shipments of coffee of the finest grade yearly amount to close upon ₱100,000. Under proper cultivation this section ought to become one of the greatest coffee-producing countries in the world.





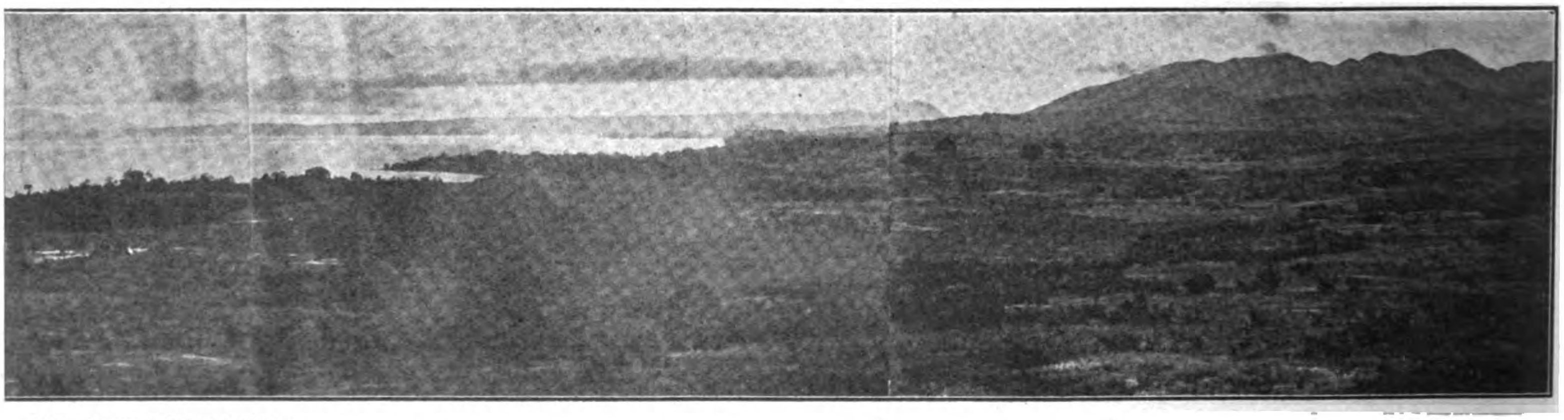


Photo by West, Fort McKinley

PANORAMIC VIEW IN THREE SECTIONS OF LAKE LANAO, WHICH EMBRACES A STRETCH OF COUNTRY 72 MS. FROM LEFT TO RIGHT

The possibilities of rubber and gutta percha are marvellous. Again the scientific cultivation of the trees and vines from which these valuable products are taken, is being urged by the government. The Forestry Bureau makes a very attractive offer of territorial grants to those who will go into rubber and gutta percha on a large scale.

Rice cultivation is another industry which promises much to the practical agriculturist. The Moros have always raised upland rice in

MORO MARKET AT MARAHUI

MOROS SELLING PRODUCE AND WARES

considerable quantities. When the American troops first arrived on the present site of Camp Vicars, on the S. side of Lake Lanao, the very ground on which the fort stands today, and the country, for miles around, was planted in rice. Along the coast and lowlands there is much land adapted to the cultivation of paddy rice. Corn and sugar are also among the products of the country, the former being one of the food staples of the Moros.

LANAO'S TIMBER WEALTH. — The timber wealth of the entire Island of Mindanao has long been counted as one of its greatest resources. In the Lanao District the forests contain high percentages of the finest and most valuable woods, and they stand practically untouched today. There is a small sawmill at Marahui, on Lake Lanao, belonging to the military, where lumber is being prepared for the construction of the new post at Camp Keithley, but there is no private milling or lumbering enterprise in the whole district. There is a rich opening here for men of capital and enterprise. Railroads are being built on all of the principal islands, towns are growing up everywhere, and it is confidently expected that the demands for the hardwood timbers of Mindanao will be very great during the next few years.

WATER POWER. — Perhaps no other part of the Philippine Archipelago is so rich in water power as is the favored District of Lanao. On the S. side of the lake, the falls of the Mataling River are capable of supplying power to the entire southern half of the district. In another column will be found a description of the marvellous Agus River and falls, and the possibilities of development for the northern half of the district. The application of such power to logging and milling, and the movement of modern farm machinery are interesting studies for those who have capital to invest and secure large returns.

CLIMATE AND LIVING.—The popular idea in the United States that life in the Tropics is a

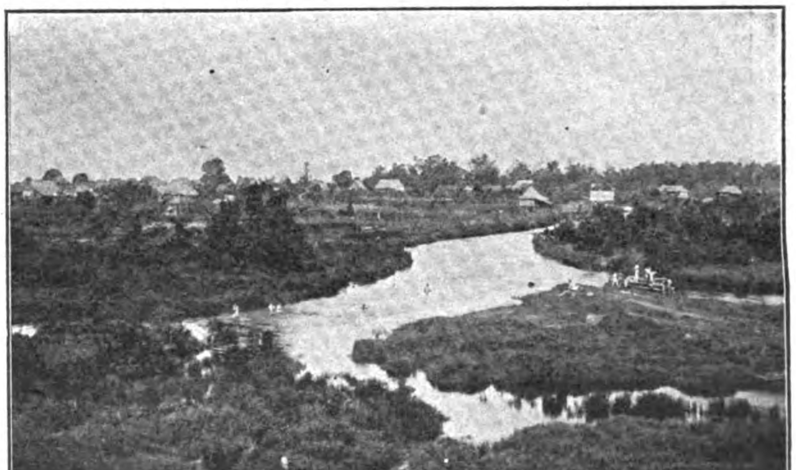
MATALING FALLS

constant struggle against heat, sickness, insect pests, reptiles, and savages, is not borne out by experience of people who have lived in various parts of the Moro Province, particularly in the Lanao District. It is a matter of daily comment throughout the archipelago that the majority of government employees who have spent 2 or 3 yrs. here and have returned to their homes in the States, are only too anxious to come back. Some of the more thoughtful, seeing the possibilities of bettering their condition here, and realizing the real advantages of the climate, are content to remain when their term of office in the government is expired, and are already "growing up with the country."

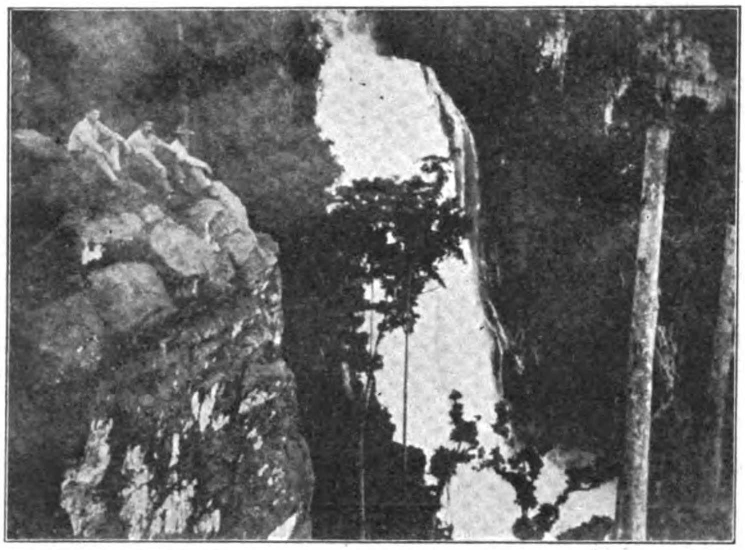
There are some notable instances of this in the Lanao District. In another column will be found the notable success of Mr. Frank Shepherd. Away in the very heart of Mindanao, in what is known as the Sevilla country, a small colony of Americans is established, and when Mr. Allen Gard, secretary of the district, visited the colony recently, he found the Americans happy and contented, and making money. The party consists of Eugene Barton, former treasurer of Cagayan Province, and his brother, Richard Barton; Louis S. Thomas, a Princeton graduate, and a Mr. Hayes. Messrs. Eugene Barton and Hayes have their American wives with them. More recently Mr. B. A. Crumb resigned his position as treasurer of the Lanao District to open up a hemp plantation in this section. He has a backing of ₱200,000 and will introduce American farm machinery into the district.

These pioneers, and many others who might be mentioned, certify to the excellence of the climate of Lanao. It would seem a bit warm, of course, to people accustomed to the temperate zone, but it is remarkable how soon one can become really infatuated with the climate. In Iligan and along the coast in that vicinity there are no sudden changes of temperature. During the heat of the day the wise man remains within his great thatched house, although experience has shown that he may go about

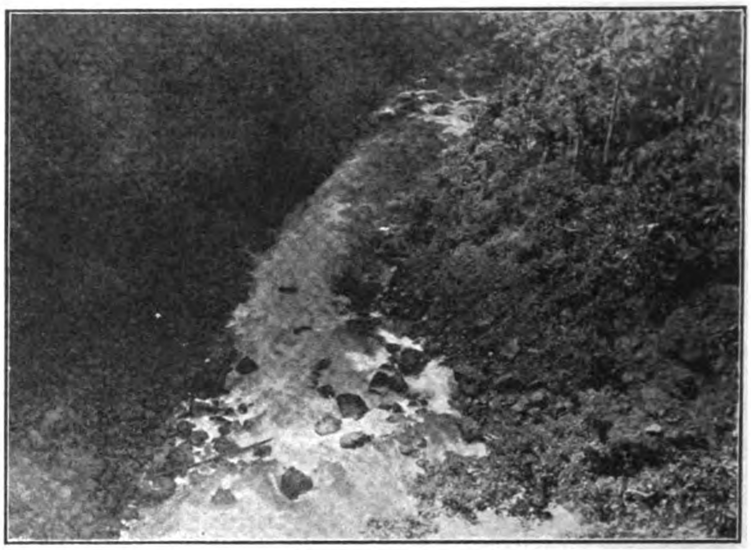
ON THE ROAD TO CAMP VICARS FROM MALABANG; MATALING FALLS UNDERNEATH THE BRIDGE



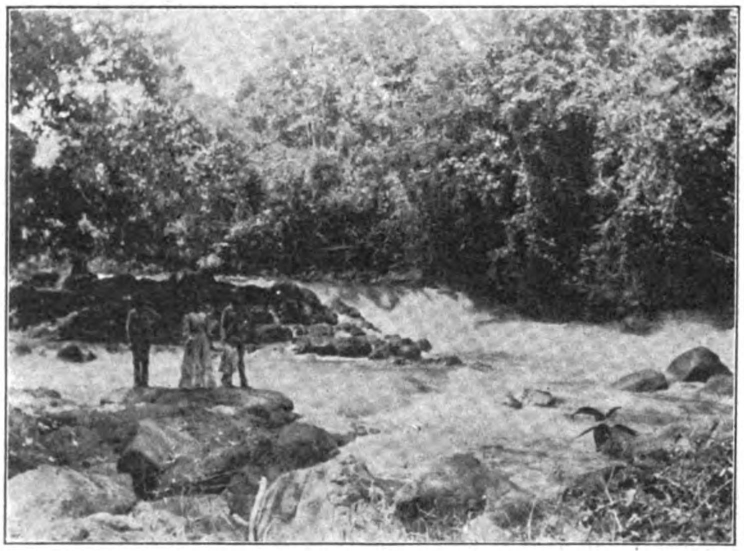
HEADWATERS OF THE MALABANG RIVER



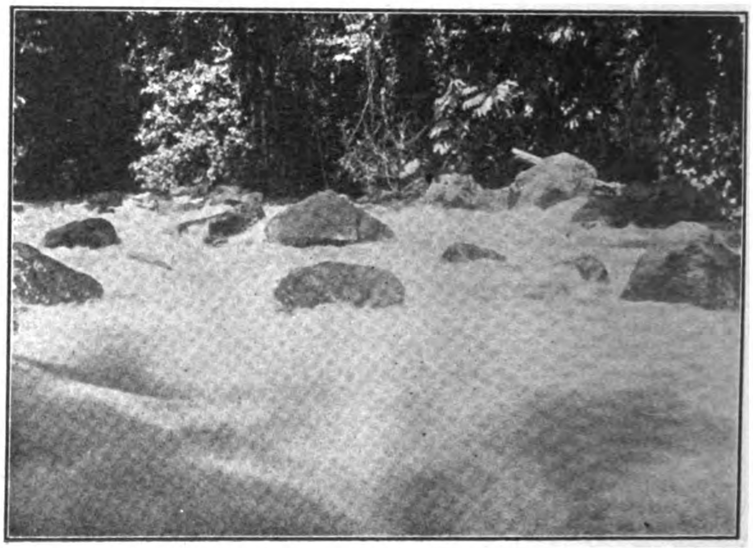
MARIA CRISTINA FALLS, AGUS RIVER; HEIGHT 197′, WIDTH 75′ TO 100′ AT TOP, ACCORDING TO SEASON; THE WATER FALLS STRAIGHT DOWN WITHOUT A BREAK



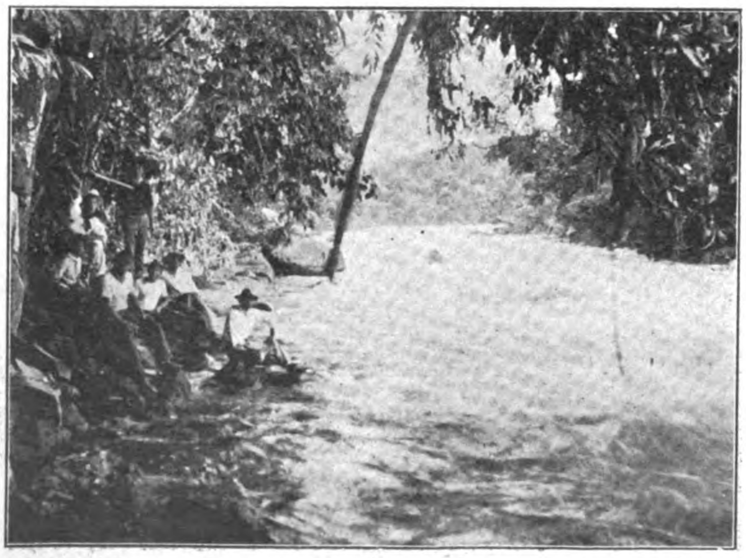
VIEW FROM TOP OF FALLS TO RIVER BELOW; FALLS ARE ENCLOSED ON BOTH SIDES BY ALMOST PERPENDICULAR ROCK WALLS 200′ HIGH



AGUS RIVER ABOUT 1 M. ABOVE THE FALLS; RIVER HAS DROP OF 2,400′ FROM LAKE LANAO TO ILIGAN BAY (ABOUT 22 MS.)



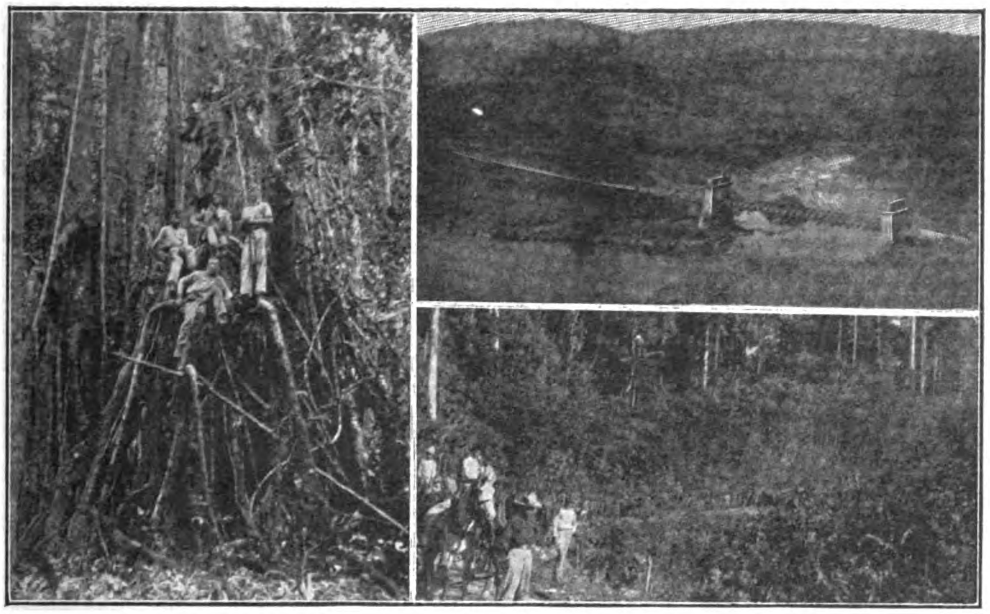
AN ESPECIALLY SWIFT CURRENT, ABOUT 30 MS. PER HR., ACCORDING TO A "LOG" TAKEN WITH A PIECE OF WOOD AND A STOP-WATCH



A LEVEL STRETCH OF THE AGUS, GIVING SOME IDEA OF GRANDEUR OF THE SCENERY

BIRDSEYE VIEW OF CAMP OVERTON ON ILIGAN BAY; THIS PICTURE WAS TAKEN FROM A HIGH RIDGE WEST OF CAMP OVERTON

Photos by Robert Schroder, Corps of Engineers, U. S. Army



FINE ILLUSTRATION OF THE WONDERFUL GROWTH OF TREES IN THE NEIGHBORHOOD OF MARIA CRISTINA FALLS; ALL ROOTS CENTER IN ONE TREE ABOVE. OLD SPANISH SUSPENSION BRIDGE AT PANTAR, OVER AGUS RIVER; SPAN OF BRIDGE, WITH APPROACHES, 175′ LONG. BILIBID (MANILA) PRISONERS WITH OVERSEERS, RETURNING TO CAMP OVERTON FROM WORK ON THE ILIGAN-LAKE LANAO ROAD

in the sun without fear of sunstroke. The nights are always cool, and very often a blanket is comfortable. The rains in the locality are frequent, during the season, and refreshing. The drudgery of housework is unknown to the American woman there. Servants are plentiful at low wages, and every practical housewife may soon have an efficient force about her.

Topography and Settlement.—Back from Iligan the land gradually rises until in the vicinity of Lake Lanao, 25 ms. from the coast, it reaches an elevation of 3,000′ above sea level. Here the climate is delightful, on account of the altitude. The air is cool and bracing, and the nights sometimes so cold that a quartermaster at Camp Vicars, on the S. side of the lake, once put in a requisition for stoves for the officers' quarters and barracks. The invigorating effects of this Lake Lanao climate are so marked that troops are sometimes given duty there in order to benefit by the bracing air.

The country in the vicinity of Lake Lanao is not, however, at present open for settlement. The majority of the Moros are settled thereabouts, and lay claim to the land. The magnificent valley between Camp Keithley and the sea is open, and there are hundreds of plantations to be had along the splendid and permanent wagon road which the military government is now building there.

In the basin of Lake Lanao there are about 50 rancherias, over which reign some 400 Moro chiefs with titles ranking from sultan to datu. These men are all known to the authorities and are now kept under almost perfect control.

Finally, it may be said that Lanao is a "white man's country," and that the Americans and other foreigners who are living there are well contented with their lot.

GOVERNMENT OF LANAO DISTRICT

Captain E. W. Griffith, who was appointed Governor of the Lanao District last March, is the first governor appointed outside of the military establishment in the Moro Province. He is, as well, senior inspector of Constabulary in the district, and in his dual capacity is in a position to be of great value in teaching his unruly people the ways of the white man.

Captain Griffith is of English birth and education. Before entering the American Army, in 1898, he saw considerable service in Africa and learned many things that have since made him a valuable agent of the American Government in the Islands. He has been in the Constabulary ever since its organization, and long ago won the esteem and confidence of his superiors. His appointment by Major General Wood as governor of the district that is more distinctly military than any in the Moro Province, speaks highly for his executive ability.

The official residence of the governor is at Marahui, on Lake Lanao, adjoining the brigade post of Camp Keithley. There the government has erected a model residence and council chamber, and there Governor Griffith receives daily the sultans, datus, and headmen from all parts of the district, hearing their complaints and settling their disputes according to the recently-established tribal ward court customs. The governor makes occasional trips into various parts of the district, so as to keep in touch with the people. He encourages farming, and puts down slavery and brigandage of all kinds. The military is ever ready to assist whenever the proposition in hand becomes too strong for the Constabulary.

Governor Griffith has been of especial assistance to prospective American colonists, pointing out good locations and helping settlers to secure the necessary labor and eqnipment.

Mr. Allan Gard, who has recently been appointed secretary of the district, is one of the most efficient men in the service of the Moro Province. A graduate of Yale University, he came to the Islands some 5 yrs. ago in the educational department. He is an excellent Spanish scholar and is fast acquiring a thorough knowledge of the Moro tongue and the customs of the people. He is energetic and fearless, and has already made some extensive trips into the heart of Mindanao that will bear valuable results. Particularly interesting is the account of Mr. Gard's trip into the Sevilla country, E. of Lake Lanao, last February and March, where he found fertile valleys inhabited by peaceable people. The hemp and coffee trade of that section is of great value, and finds an outlet through Cagayan de Misamis, adding in no small measure to the wealth of that place. Already several Americans have settled there, and the section is one of great promise.

The governors of this district, since its organization, have been officers of the army, keenly interested in the development of the resources of the district. The first governor was Major R. L. Bullard, 28th Infantry, who was followed by Captain D. B. Devore, 23rd Infantry. Both of these officers did much to promote the development not only of good order, but of agriculture and industry.

ILIGAN THE METROPOLIS

The Town of Iligan, picturesquely situated on Iligan Bay, on the N. side of the island, is the principal place of importance in the district. Three miles distant, on the bay shore, is the military post known as Camp Overton, at which point the only road into the interior of the island commences. Iligan is a prosperous place of about 5,000 inhabitants, for the most part Visayans, with a few Chinese and Americans. The country thereabouts is rich and very fertile, and already several hemp plantations nearby are contributing to the material wealth of the place. There is a large Moro market there, but no Moros are permitted to reside within the town limits. A very efficient company of Moro Constabulary, under Captain Green and Lieutenant Maklin, is stationed there. The members of the company are natives of the district, with a few Moros from Cotabato and Zamboanga. They have proved to be very faithful soldiers and keep order in the district.

Iligan has a regularly-organized municipal government and city council. Señor Leon Fernandez, the present presidente, is an able man, and has the full confidence of the district and provincial governments. Other members of the city council are Señores Silverio Echavez, vice-presidente; Eustaquio Leander, Regino Abestillas, Mariano Ramiro, Engracio Adeva, Eustaquiro Perfecto, Bonifacio Ladlad, and Martiniano Actub. The streets and other public works of the town are in excellent condition, and the sanitary affairs could not be in better shape.

The people of Iligan are anxious to build up their town and to attract capital and settlers to that vicinity. They may well look forward to a bright future, as Iligan is sure to be the metropolis of the rich Lanao District, the probable future seat of the capital, and the home of the larger planters of the section.

Here, as in other settlements of Mindanao, the Chinese merchant is a potent factor in commercial matters. As a class the Chinese merchants are enterprising and progressive, ready to take part in any movement for the public good; they are also charitable and law-abiding. They are heavy tax payers, and generally have the confidence of the government.

Señor Julian Parrado is the leading Chinese merchant of Iligan and a man of wide influence. He came to the Islands about 20 yrs. ago, and after serving an apprenticeship in Jolo under Captain Tiana, opened up a business of his own in Iligan, about 11 yrs. ago. He early gained the confidence of the Spanish authorities, and was made *Capitan Chino* of the whole N. part of Mindanao, in which capacity he served until the American occupation. He was decorated by the Spanish Government for service rendered to the army. Although his office was abolished by the American Government he still retains the greatest respect of the authorities, to whom he has been of good assistance. Señor Parrado trades throughout the whole portion of the island importing from China, Europe, and the United States, and exporting coffee, hemp, copra, cacao, rubber, etc.

Señores Sy Pico and Carlos Martel, also prominent Chinese merchants of Iligan, are owners of hemp plantations. It is only since American occupation that these enterprising business men have been able to carry on their haciendas. They are now planting hemp on a large scale, and will likely add gutta percha, cacao and copra to their products.

The other Chinese merchants of prominence who are interested in the promotion and development of the district are Señores Sy Yanco, Yu Quico, Co Jatin, Dy Juyco, Dy Panco, Sy Chysing, Tan Dico, Tan Quinsing, Go Juaco, Dy Dinco and Siao Quico.

MR. FRANK SHEPHERD'S THREE STORES AND PLANTATION, ILIGAN

The accompanying illustration is from a photograph of Mr. Frank Shepherd, the proprietor of Shepherd's Three Stores and Plantation at Iligan.

Mr. Shepherd is one of the early American pioneers in the Philippines. He became imbued with the war fever during the Spanish-American excitement, and resigning his position in civil life enlisted in the 16th U. S. Infantry, of the regular establishment, at St. Louis, Mo. After serving 8 mos. through the Cuban campaign, he returned to his former position as a commercial traveler. About 2 mos. later he learned that his old regiment was again ordered to the wars, with Manila as the objective point. Once more resigning his position he reënlisted in the 16th. He arrived with his organization in the Philippines on June 26th, 1899, and served a full enlistment of 3 yrs. Immediately after its arrival here his regiment was ordered on the firing line, taking charge of the Manila & Dagupan Railway, along which line hard service was experienced in clearing and protecting the line to Dagupan. After the engagement with the Filipino insurgents at San Mateo, where Major General Lawton, U. S. V., was killed, the regiment was ordered to the Cagayan Valley to lift the blockade at Aparri, the most northern port in the Island of Luzon, and allow trade to be reëstablished in the great tobacco district comprising the Provinces of Cagayan, Isabela and Nueva Vizcaya.

After completing his full enlistment, being discharged the service March 13th, 1902, Mr. Shepherd saw that there was a future in the Philippines for any person who cared to hustle. He immediately entered the commercial field and opened two places of business in Aparri. Later he transferred his business to Iligan, Mindanao, arriving there October 31st, 1902. Since that date he has remained in this splendid location. By degrees his establishment has been built up to become one of the largest mercantile concerns, both wholesale and retail, in the Moro Province, and now he carries a tremendous stock. He is one of the heaviest buyers in the provinces. Strict attention to business, constant hard work and no "knocking" have been the secret of Mr. Shepherd's success.

Previous to the establishment of civil government and the appointment of Major General Leonard Wood as Governor of the Moro Province, Mr. Shepherd earned, most deservedly, the confidence of all with whom he transacted business, both natives and foreign-born. After the appointment of General Wood Mr. Shepherd was one of the first to see the masterly manner in which the governor won the good will and friendship of all the inhabitants of the Moro Province, and to realize that there was no better opportunity for investment than right where he was. He decided to put all his surplus money accruing from his business into the Moro Province, and this decision he has never regretted. He strongly advises all to invest their capital in the future of Mindanao, but he does not believe this can be done with impunity unless the persons thus interested band together. His experience has been that small capital is of no use for working or plantation purposes owing to the fact that it is necessary to wait for some time in which to realize returns on the capital invested; but when this return does come it shows a big percentage on the capital invested, amounting, very often, at the end of 5 yrs., to from 80 to 100 per cent. Mr. Shepherd believes that if the home government would allow the people who are on the spot, and who are acquainted with local conditions, to have a little more say in the matter of local government, it would be to the advantage of Americans and natives alike.

MR. FRANK SHEPHERD, PROPRIETOR OF SHEPHERD'S THREE STORES AND PLANTATION, ILIGAN

Hemp Plantation.—Having the utmost faith in the government, as previously mentioned, and believing in the future development of the Moro Province, Mr. Shepherd began, 2 yrs. ago, investing all the profits which accrued from his business in acquiring a hemp plantation. He has taken up to date 1,000 acres of government land and has cleared and planted one-third of this tract. The land already cleared and planted carries approximately 700 plants or *hills* to the acre, and more than one-half of this will be ready for harvest early in the coming October, which will give an aggregate output from about 120,000 plants. It is commonly understood that Mr. Shepherd ownes the largest hemp plantation of the province.

Labor Problem.—Regarding the labor proposition, Mr. Shepherd believes in the employment of native workmen as far as possible, but owing to the fact that it is impossible to trust for regular work from them, in spite of furnishing them with an abundance of food and giving them a wage of 25 cts. gold per day, it is almost a certainty that no more than two days' work per man can be obtained each week, with the exception of a few who are more serious and desire to create a home for themselves. The wage is paid to them every Saturday morning, and although there may not be more than from 75 to 100 persons working daily there will be as many as 150 to 200 to collect wages on Saturday. This distinctly proves to Mr. Shepherd that the average native, when he has earned sufficient to support himself for the balance of the week, does not care to work any longer until his money is gone. Among the many laborers Mr. Shepherd handles there are but few who will work a full week.

HEALTH RESORT AT MARAHUI

Governor Griffith and the people of Iligan are anxious to establish the reputation of Marahui as a health resort. The town is in the heart of the Moro country, adjacent to a large military post, and offers many attractions that promise to make it the Mecca of tourists, once transportation is made easy and proper accommodations are provided for the traveling public. The proposed electric railway from Overton to Camp Keithley, once it is completed, will make the trip inland from the coast of short duration and delightful. There is every reason to believe that this railway will be completed at no very distant date. At present the military is building a macadan road and it is said that the army transportation and the maintenance of this road between Overton and Keithley, cost about ₱600,000 per year, to say nothing of the delay and inconvenience caused by wagon-train travel.

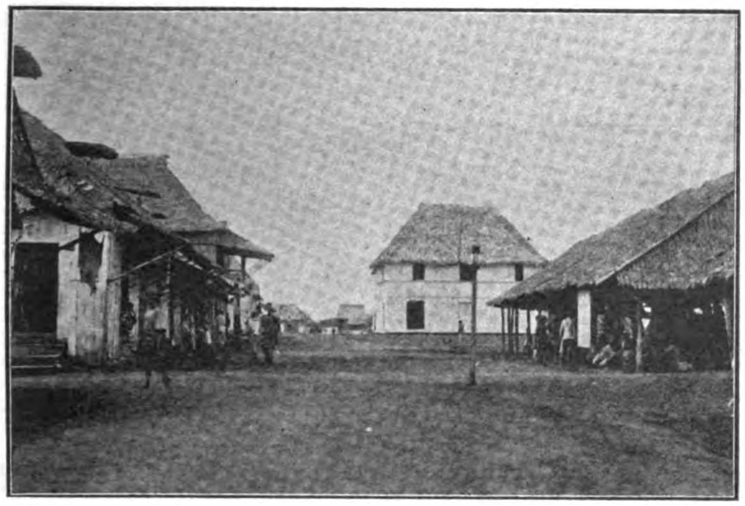
The town site of Marahui is now in the military reservation, which is very extensive. Efforts are being made to have the town taken off the reservation, and that in itself would greatly facilitate the plan proposed by Governor Griffith.

It is proposed to erect two commodious hotels, one at Iligan and the other at Marahui, where travelers may receive the same care and attention that they do elsewhere in interesting parts of the globe. In connection with the hotels will be tennis courts, golf links, stables, etc.

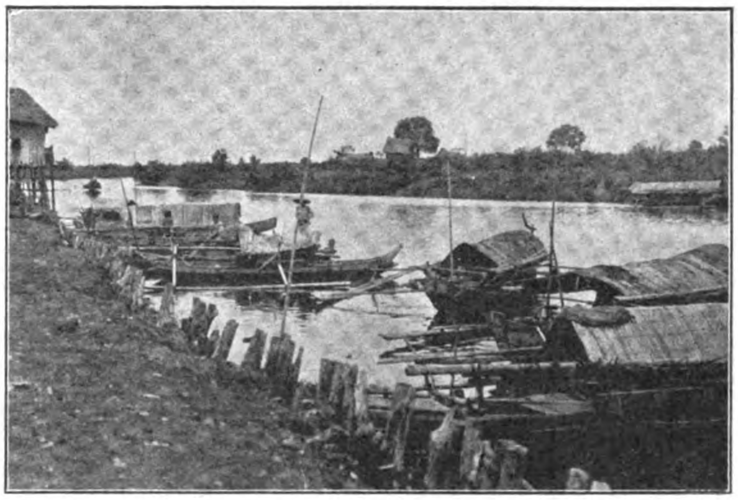
The country about Marahui is delightfully picturesque, and the air is cool and bracing. The hunting all about is good. The lake offers pleasing prospects for launch and picnic parties. The military post, with its band and dress parades, offers diversion. The market at Marahui is the largest in Mindanao and the greatest curio emporium in the Philippines is also located here.

Marahui could easily become a rival of Baguio. During several months in the year the steamer trip southward and a visit to Marahui would be an attraction worth having. The falls of the Agus River, at Maria Cristina, on the Overton-Keithley Road, are worth going 1,000 ms. to see. There the great Agus River outlet of Lake Lanao, makes a plunge of about 220. over the picturesque rocks into the valley below,

MALABANG IS THE GREATEST COFFEE MARKET OF THE MORO PROVINCE



STREET OF MALABANG; MUNICIPAL BUILDING IN THE DISTANCE



SCENE ON THE MALABANG RIVER

Malabang, the S. gateway to the Lanao District, is principally noted as the most extensive coffee market in the Philippine Archipelago. It is a town of about 2,500 inhabitants, picturesquely located on Illana Bay, under the frowning Spanish fort where now stands the Post of Malabang. During the coffee season, from August until the end of February, the town doubles in population, and is a very busy mart of trade.

The town lies about ½ m. back from the beach, on a broad, deep river which finds its source in a dozen or so great springs gushing from the hill upon which the fort stands. The water is pure and clear, having a temperature of 72 degs. as it comes from the ground. It is deep enough to carry a launch of 9′ draft.

Lieutenant W. P. Screws, 19th U. S. Infantry, was placed in charge of the town last September, and was later made presidente. He has brought about many improvements, and if his plans are carried out Malabang will become one of the most prosperous municipalities in the province. There is now under construction a Moro Exchange 125×40′, built of hard wood timber, with corrugated iron roof and cement floor, with a fish market attached, 50×50′, of the same materials. Here all transactions will be carried on in cash, and the control will be similar to that of the Zamboanga Exchange. A permanent road to the beach is also under construction.

The Malabang market offers a greater variety of produce than perhaps any other in the Southern Islands. Fresh fish in great variety, corn, lettuce, radishes, beets, cabbage, cucumbers, tomatoes, American sweet potatoes, beans, etc., all in great abundance, are cheap. The place is noted for its luscious pineapples.

When the Americans first went to Malabang the coffee market was at low ebb, and the price offered per picul rarely exceeded ₱12. The Moros in the vicinity were vicious and unruly, more given to slave-trading and other outlawry than to honest toil. Murder was rife, and existence outside of the sentry lines uncertain to say the least. Five years of American rule have changed everything. The bad element is no more, and Americans live miles from the reservation without molestation. Last season 250,000 lbs. of coffee were marketed in Malabang at prices ranging from ₱28 to ₱30 per picul. It was the greatest year ever known there. The town held a grand celebration on this account which lasted for days, and everything is now prosperous.

The coffee country begins about 10 ms. inland and extends clear back to and around Lake Lanao. The greater part of it is under the control of the Sultan of Ganassi and Datu Grande, the ruling chiefs of that region, both of whom are now friendly to the Americans. The bulk of the coffee grows wild, although large tracts of land have been planted by the Moros during the past few years. The industry gives employment to a large number of people.

During the harvest season the traveler on the military road, which leads from Malabang to Camp Vicars, on Lake Lanao, meets long strings of pack-ponies, loaded down with coffee, on their way to market. In Malabang the scene is a busy one, for, having disposed of their coffee, the Moros must buy salt, cloth, dried fish and finery, and they are fond of haggling over the price and making the most of their visit to town.

Hereafter all sales of coffee will be made in the Moro Exchange, the weighing will all be done under government scales, and under the watchful eye of an inspector.

Manuel Acosta is the largest buyer of coffee, shipping it to Manila in 100-picul lots. Pedro Martinez and several Chinese merchants are also in the business.

During the past 5 yrs. not a little hemp, raised in the mountains by the Moros, has been marketed in Malabang, and it is reported

ILIGAN-LAKE LANAO ROAD NEAR TOP OF HILL ABOVE CAMP OVERTON; ILIGAN BAY BELOW

that many are planting. The hemp marketed is of excellent quality. Pedro Martinez and others have recently started a plantation near the town, and are planting hemp and cocoanuts on a large scale. Two ex-soldiers, Messrs. Johnson and Fife, have planted along the beach 5 and 6 ms. respectively, from Malabang. The former has been there for 2 yrs. and the latter about 1 yr. There is plenty of good land in the vicinity of Malabang that is now open for settlement. The climate is pleasant and the health of the location exceptional. The members of the Municipal Council of Malabang hold their commissions by appointment, and the ordinances they pass are subject to the approval of the Legislative Council. At present the members of the council are Lieutenant Screws, presidente; Manuel Acosta, Pedro Martinez, Antonio Coronel and Louis Golfin. Tan O'Cio, a wealthy Chinese merchant, is *Capitan Chino*.

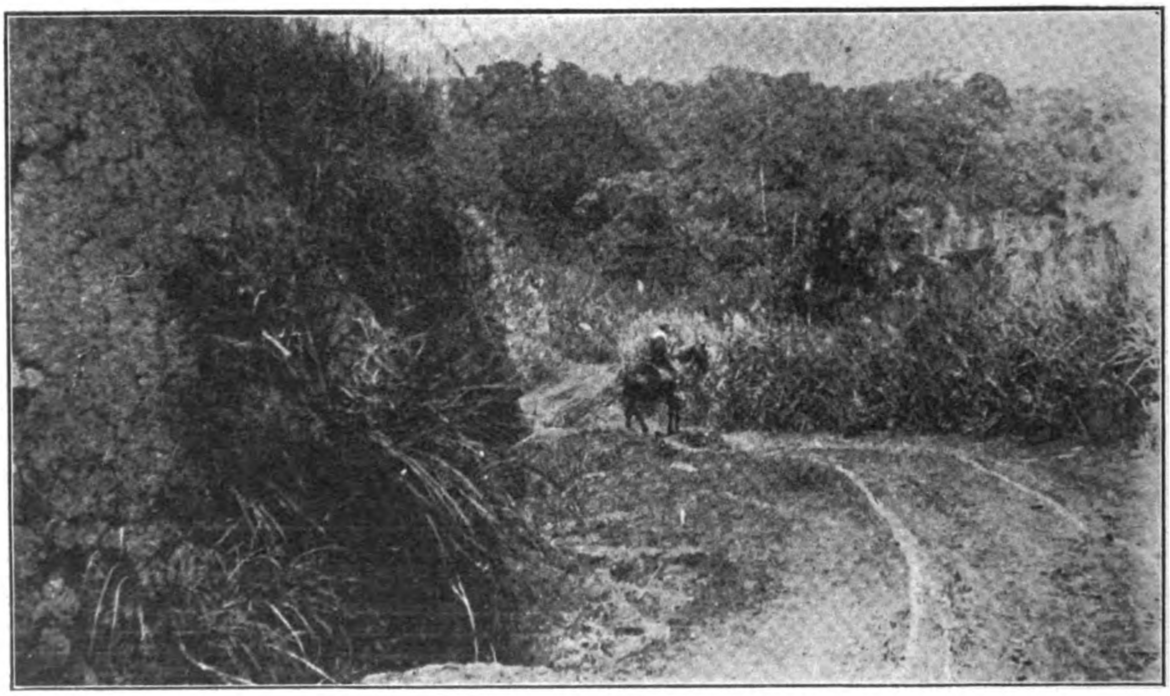
MAYO BAY PLANTATION

Mati, on the E. coast, is one of the finest harbors in the Island of Mindanao The town has about 2,800 Visayans. Henry M. Hubble is the only American settler in this section. He has a plantation at Mayo Bay, about 14 ms. from the town, and Mrs. Hubble, an American lady, lives there with him. They have resided there about 2 yrs., and Mr. Hubble has a considerable acreage of hemp and cocoanuts planted.

The hemp land in the vicinity of Mati is limited, but there are cocoanut and sugar land, and cattle ranges that will support about 10,000 head of cattle. Shipments of cattle to Manila are made each month.

Baganga Valley Plantation.—Baganga, the only other place of any importance on the E. coast, is a town of some size. It has no harbor, however, and is practically inaccessible for several months of the year. The valley of the Baganga River is rich and fertile, and there are a number of hemp plantations here. The only American *hacienda* is managed by Christian Ade. He has 50,000 hemp plants set out, some of them now of stripping age.

SECOND COATING OF STONE NEAR MARIA CRISTINA, ILIGAN-LAKE LANAO ROAD



PANTAR HILL, ILIGAN-LAKE LANAO ROAD

AGRICULTURAL PRODUCTS

Mr. Max L. McCullough, secretary-treasurer of the Davao Planters' Association, has furnished to THE REVIEW, the following statement covering the agricultural products of the district:

This subject of the products of the District of Davao will be dealt with under three heads—jungle produce, present crops, and new crops.

Jungle Produce.—By the term jungle produce is meant anything of a commercial nature that is found in the forests and which may be collected and sold. The most important items at the present time are, perhaps, almaciga and beeswax. Our forests abound in other things which in other parts of the Far East are gathered by natives, exchanged for commodities, or sold in the open market. As an example take *bejuco*, sold in other parts as rattan, which might be collected in quantities in the Davao District; also *cutch*, a produce made from Tangal bark, from which is made a superior kind of khaki dye, as well as the Tangal bark itself—used in tanning— might be exploited with profit. Cinnamon has been found in different places, and who shall say in what quantities it exists in our almost unexplored forests? The common red pepper met with everywhere along trails and in old clearings, very likely has a commercial value. The writer took a sample to a spice broker in San Francisco who pronounced it second

only in appearance to the best chillies grown in Sierra Leone. These were selling at 16c. gold per lb. Sassafras bark is found in certain localities, as are, perhaps, other spices which may prove of more or less value. Rubber and gutta percha are also found in the jungle.

We are not making the best use of these natural resources of the country. A reason for this may be that we are too busy with hemp and cocoanuts, and that the time has not yet arrived with most of us when leisure can be found for and time given to other lines of work. This is true to a certain extent; but if jungle produce is valuable, why not devote some little time to its collection? It may be said that labor is scarce and that it is with difficulty that enough men are found to carry on plantation operations. The trouble in most places is not in an insufficient number of laborers, but is due to the fact that they are not constant workers,—that they work only a fraction of the time in the fields. Could not arrangements be made whereby jungle produce might be collected without the actual supervision of the American planter? If native datus knew that certain commodities growing in their woods were valuable and that from them they could receive in trade needed articles for plantation houses, it is believed that they would learn to collect jungle produce with their own unoccupied men and thus not interfere with the labor supply now used on plantations.

Present Crops.—Under this head it will not be necessary to more than name hemp and cocoanuts as the main products grown. Cacao, which, before hemp had attracted the attention of Davao was the principal crop of the district, has been allowed to dwindle until it holds a very insignificant place in agricultural activity. It is satisfactory to know, however, that one of our members has large plans for cacao, and already has several thousand young trees in a nursery to be set out next Spring.

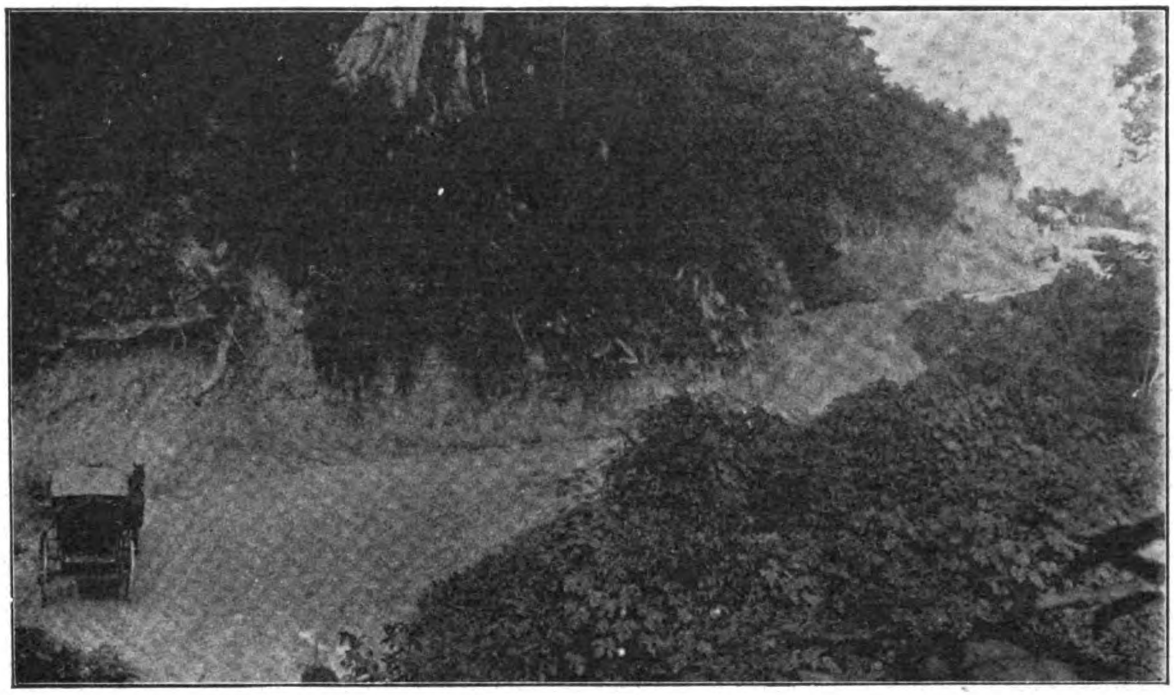
New Crops.—First may be mentioned the kapoc tree, the fiber of which is commonly known as tree cotton. Kapoc fiber is an important item of export from Java and is used in many parts of the world for pillows, cushions, and mattresses. The tree is found in many parts of this district, but no commercial use seems to have been made of the fiber, a considerable part of which is allowed to go to waste. From the ease with which branches take root when planted and the rapidity of growth of the tree, it seems that something might be done with this article. As soon as roads and boundaries are laid out, why not line them with a few hundreds or thousands of this tree, the fruit of which could be collected and prepared for the market easily by women and children?

Another article which is attracting increasing attention is maguey or sisal hemp. Sisal hemp fiber is preferred to Manila hemp for the manufacture of binder-twine and is largely used for cheaper kinds of rope. The bulk of the world's supply comes from Mexico and Central America. The province of Yucatan alone last year exported $20,000,000 worth of this fiber. There is a large plantation of maguey near Honolulu, and considerable quantities are grown in Northern Luzon. It will grow on almost any land that is well drained, whether it be level or hilly, loam, clay, or soil full of sand, gravel, and rocks. Almost no attention is required to keep it alive, and the value of the harvest is not inconsiderable.

Machines for extracting the fiber are perfected so that a large force of laborers is not required. Honorable Dean C. Worcester, Secretary of the Interior, has this to say of maguey: "Its yield per given area of ground is perhaps fully as large as *abacá*, and its selling price about ¾ of that of *abacá*. So the chance of making the business profitable would look to be fully as good as is the case with the *abacá*." The provincial government has been requested to have sent to this district for free distribution, 5,000 plants of a superior kind of maguey. It would be interesting to know whether or not maguey would hold its own and grow satisfactorily on cogon land. If so, there may be quite a future for it in this district.

Finally, the new crop which is attracting the most widespread interest throughout the tropical agricultural world of the Far East and which as yet is a stranger in Davao, is rubber. The price of crude rubber, like the price of all other commodities, is regulated largely by supply and demand. The bulk of the world's supply of rubber has formerly been collected and is now obtained from the forests of the Amazon River Valley. The amount of plantation-produced rubber sold on the market to-day is about one per cent of the world's requirements. The world's *demand* for rubber has increased much faster than the *supply* and consequently has produced a very high price for the crude article. The best pará rubber of the Amazon valley or Ceylon plantations frequently brings $1.50 gold per lb. Three or four hundred trees are planted to the acre and each tree gives at least 1 lb. a year, so that the income from well-kept rubber estates in full bearing is today something remarkable. It has been estimated that to plant and bring rubber up to full bearing requires from £10 to £20 per acre, and that the income per acre at present prices amounts to £80 per year. From two to four men per acre are sufficient in Ceylon to care for the crop. The great interest that is being shown in rubber plantations may be seen from the following figures: Output of rubber in Ceylon in 1902, 7 tons; in 1904, 35 tons. Acreage planted in Ceylon and the Federated Malay States, 80,000 acres. Estimated yield of rubber in 1911, 16,000,000 lbs. This 16,000,000 lbs. is about 12½ per cent of the present output. The *Straits Budget* places the world's demand at the present time at 56,000 tons of crude rubber per year. It was thought that rubber trees should not be tapped before the 6th yr., but recently tapping in the 4th yr. has been advocated as not only not being injurious to the tree but as being even beneficial. The soils of Ceylon are said by many to be poor soils, yet they produce in quantities rubber which fetches a higher price than the best Amazon pará. The soils of the Federated Malay States are better, and prospects for rubber there are brighter. Rubber grows well in many parts of Borneo and Java. Will it grow in the virgin soils of Southern Mindanao?

But what is the use of talking rubber at all? Is there not ready at our very doors a product whose properties and productiveness is well known? Why talk new crops for Davao when we have a constantly expanding field for hemp? In answer, let us ask, Why not? *We* have plenty of land (or rather, we think we have). There is plenty of land in the district, why not put some effort into a new thing that promises so well for the future? Why not diversify our products a bit? Why insist in carrying all our eggs in one basket? Let us take as an example the Island of Ceylon: First it was chinchona and fortunes were made in that; next, it was coffee and coffee was king; next came tea; and now they are interplanting their tea with rubber. At the present time hemp looks good, and it *is* good, and very good. But who will say that in ten years from now it will be as good. Who can tell just what effect the introduction of machinery will have on the hemp industry, or what the effect will be of the constantly increasing production of maguey, or sisal hemp? We hope for the best, and we believe that not in 10 nor 20 yrs. will *abacá* cease to be productive of great profit. Is it not wise, however, to think some on the unexpected and to expend *some* effort on things aside from *abacá*? We have asked for a government experiment farm for Davao. We may get one in the future. In the meantime, let us carry out some economic experiments ourselves and seriously consider the diversification of agricultural activity in Davao District.



HORSE SHOE BEND ABOVE CAMP OVERTON, ILIGAN-LAKE LANAO ROAD

District of Cotabato

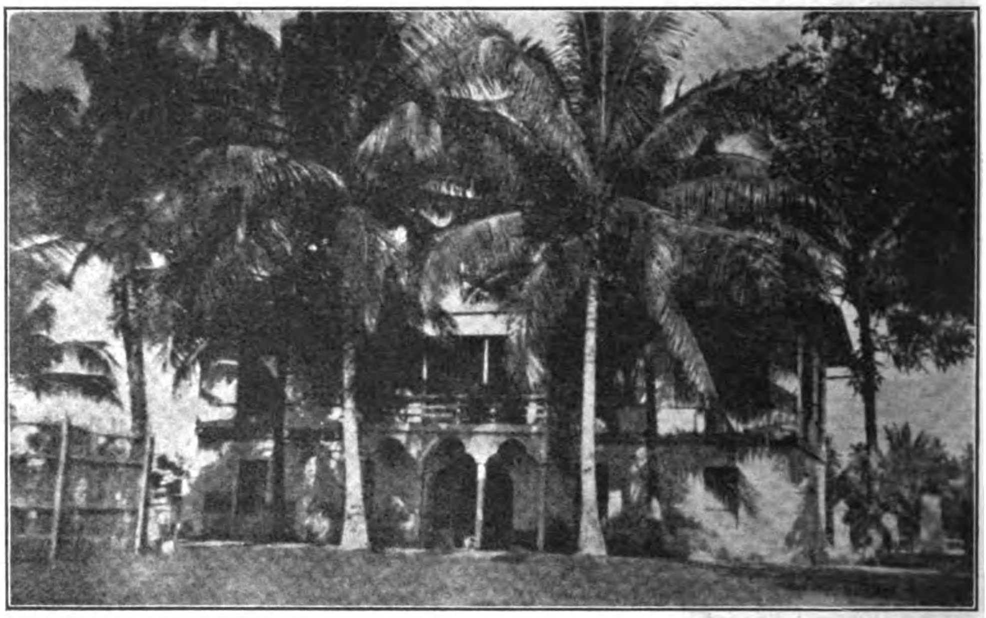
Suppression of Moro Outlawry and the Establishment of American Sovereignty in this Section, Opens up a Country Fabulously Rich in Agricultural Products and Gutta and Rubber Prospects

The District of Cotabato is probably one of the richest, if not the richest, in the Philippine Islands; an immense valley which resembles very much the valley below Saigon, and presents an ideal country for rice, sugar, and tobacco. It has a very heavy rainfall around the mountain slopes. Hemp and copra do excellently; and, in the higher reaches of the mountains, the vegetables of the temperate zone.

The governors of this district have, since its organization, been officers of the army. The first governor was Captain Carl Reichmann, 17th U. S. Infantry, who left the district to assume the duties of military attaché with the Russian Army in Manchuria. His successor, Captain Robert O. Van Horn, 17th U. S. Infantry, has just been relieved to return to duty with his regiment in the United States. Both of these officers devoted every energy to the building up of the agricultural interests of the district and the establishment of friendly relations with the natives.

The disturbance in this district, known as the Ali outbreak, was incident to a datu refusing to give up slave-trading and slave-holding. Now that this difficulty has been ended, it is confidently expected that the output of the district will be among the largest in the Moro Province.

In the upper reaches of the valley are immense quantities of rubber and gutta percha, which are already, now that peace is established, beginning to come out in considerable quantities.



OFFICE BUILDING OF THE GOVERNMENT OF THE COTABATO DISTRICT

ORGANIZATION OF THE DISTRICT.—The District of Cotabato is organized like others in the Moro Province, with Major Boyd, an officer of the Philippine Scouts, as governor. L. P. Hamilton is the secretary, and has done much to bring the resources of the valley to the notice of the public. Mr. O. W. Ward, the American postmaster, is an influential resident. Frederick Lewis, one of the five assistants to the Governor of the Moro Province, makes his headquarters in Cotabato, but puts in the major portion of his time traveling in the interior and familiarizing himself with the language and customs of the people.

POSSIBILITIES OF THE COTABATO VALLEY.—The possibilities of the great Cotabato River Valley are well-nigh limitless.

For centuries—may be ages—this great stream, second in size in the Philippine Archipelago, draining as it does a watershed of nearly 1,000,000 acres, has spread thick layers of alluvial soil over the vast bottom lands.

And there this land lies today, undisturbed by the hand of man except a spot here and there where the primitive Moro has scattered the surface to secure a small crop of rice.

During the last 50 yrs. a few Spanish and Chinese pioneers have made futile attempts at cultivation in the district. The jealous Moro datus stole their cattle, drove off their laborers, and forced them to retire into protected towns.

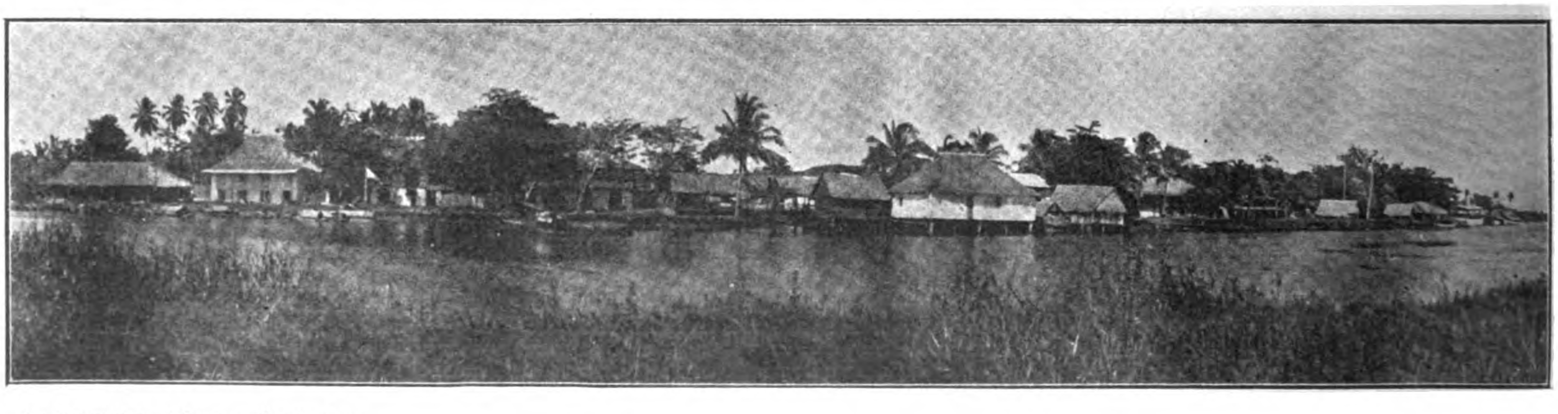
ERA OF PROSPERITY BEGINS.—But an era of prosperity is at hand. The strong arm of the American military has curbed the spirit of the slave-trader and the erstwhile pirate. There have been bloody battlefields and many a lord of the soil, who previously ruled by the *kris* and the *borong*, has gone to join his fathers.

Peace reigns in the valley today. On the ground where once the keels of the piratical war galleys were laid, there stands today a modern and model market where thousands of Moros gather daily to buy and sell the products of the farm and loom. In the place of the war galleys are trading steamers, the *kris* and *borong* are only marketable now as curios, and no man calls another by the title of "Master."

The Cotabato River is an exceedingly interesting stream, having its source in the very heart of the Island of Mindanao. At the mouth it flows into the sea through five different channels, two of them navigable. One of them is navigable for vessels drawing 12′ of water, for a distance of 6 ms., and vessels of 6′ draft can go up 50 ms. further. Small launches can go up the river nearly 100 ms. and can enter Lake Liguasan, which is 40 ms. E. of the Town of Cotabato. The town is the port of import and export for all the trade of this immense valley, the bulk of the import trade being in the control of the Chinese, who also handle practically all of the export trade.

TOWN OF COTABATO.—The town is situated about 5 ms. from Illana Bay, on the S. bank of the N. arm of the Cotabato River, and lies just above high water at high tide. The population is a mixed one of about 1,200 inhabitants. There are about 200 Chinese traders and two Chinese, who own all the town property with the exception of a few shacks. The balance of the population is made up of half-breeds—Tagalo-Moro and Moro-Chinese—and the mixture of the centuries of the nomadic Malays, Moro and pagan tribes. The latter own nothing. They are not engaged in trade, and subsist of recent years chiefly by pretending to work for the Americans at the military post.

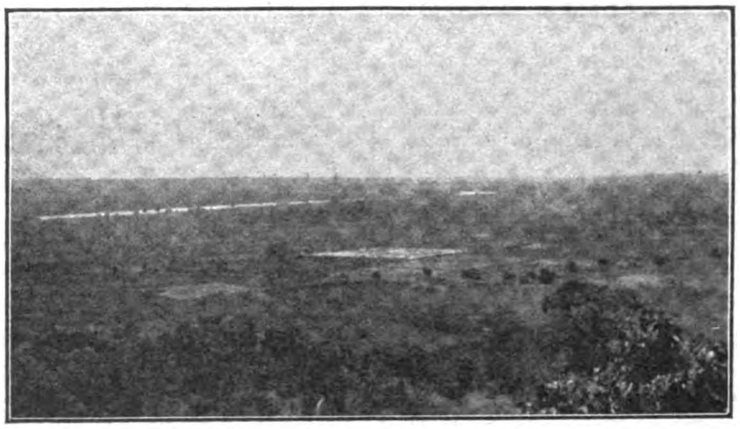
Practically all the trade of the great valley centers in Cotabato. The exports are rubber, gutta percha, hemp, copra, coffee, sugar, rice, cacao, and forest products. In the past the most important trade has been in rubber and gutta percha. The rubber tree and gutta percha vine grow wild and in great luxuriance throughout the district. The Moro datus forced their slaves to gather these products, and found a ready market for them at Cotabato. Before trade was shut off, as a military necessity, in 1 yr. 400,000 lbs. of gutta percha were exported by Cotabato traders. The trade has



By Permission of Encinas, Zamboanga

RIVERSIDE VIEW OF COTABATO, CAPITAL OF THE DISTRICT OF COTABATO

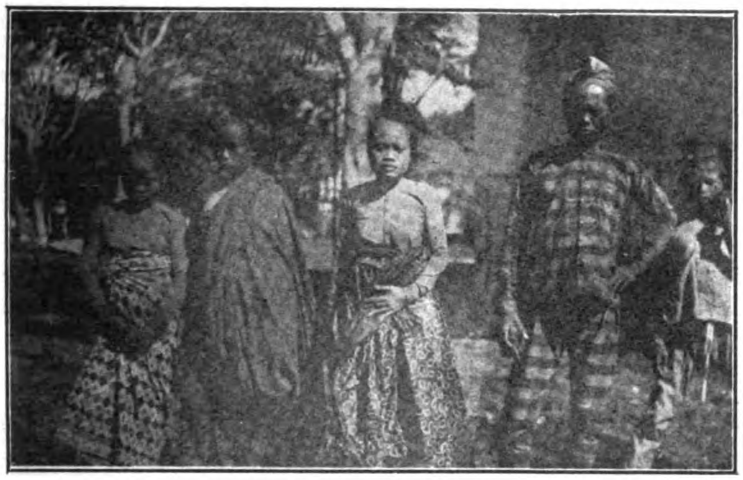
VIEW OF COUNTRY IMMEDIATELY BACK OF COTABATO, IN THE COTABATO RIVER VALLEY



RICE LAND IMMEDIATELY BACK OF COTABATO, IN THE COTABATO RIVER VALLEY

now been reopened, and it is expected that this year's export will be very valuable.

COTABATO WATERWAYS.—While the Cotabato River extends to within 40 ms. of Cagayan on the N. of the Island, the valley proper extends for about 15 ms. wide to 75 ms. long, on an average; the gradual rise in the country then forms a series of undulating, open, well-grassed plateaus with well-watered ravines. The trade from the plateaus is very small until within 30 ms. of Cagayan, and the intervening country between the river and that point is inhabited by Monobos and Monteses, who care little for trade and subsist on camotes, corn and the wild fruits of the country

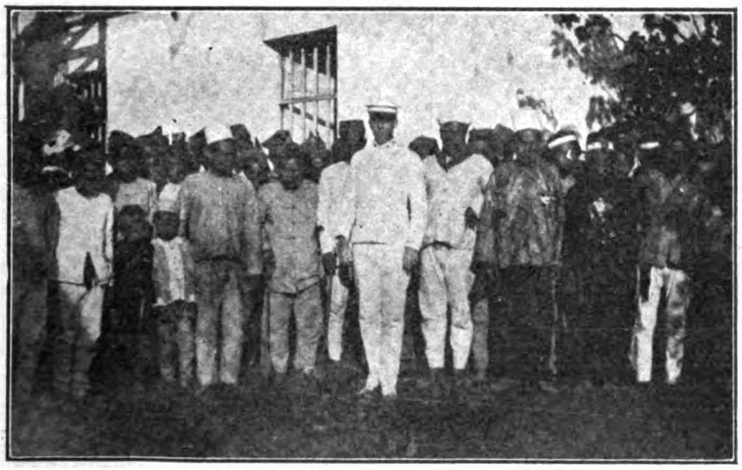


DATU MATABALOU AND HIS WIVES, COTABATO DISTRICT; HE IS NOT IN CONVICT CLOTHES BUT IN HIS BEST SUIT; HE IS ARRANGING TO TAKE ANOTHER WIFE; THE KORAN ALLOWS FOUR

MANALINTAU, THE LAST OF ALI'S WARRING DATUS TO COME IN AND TAKE THE OATH OF ALLEGIANCE TO THE UNITED STATES; HERE THE SHERIF AFDAL IS ADMINISTERING THE OATH ON THE KORAN, DATU PIANG STANDING BY; ALL OF THE COTABATO DISTRICT

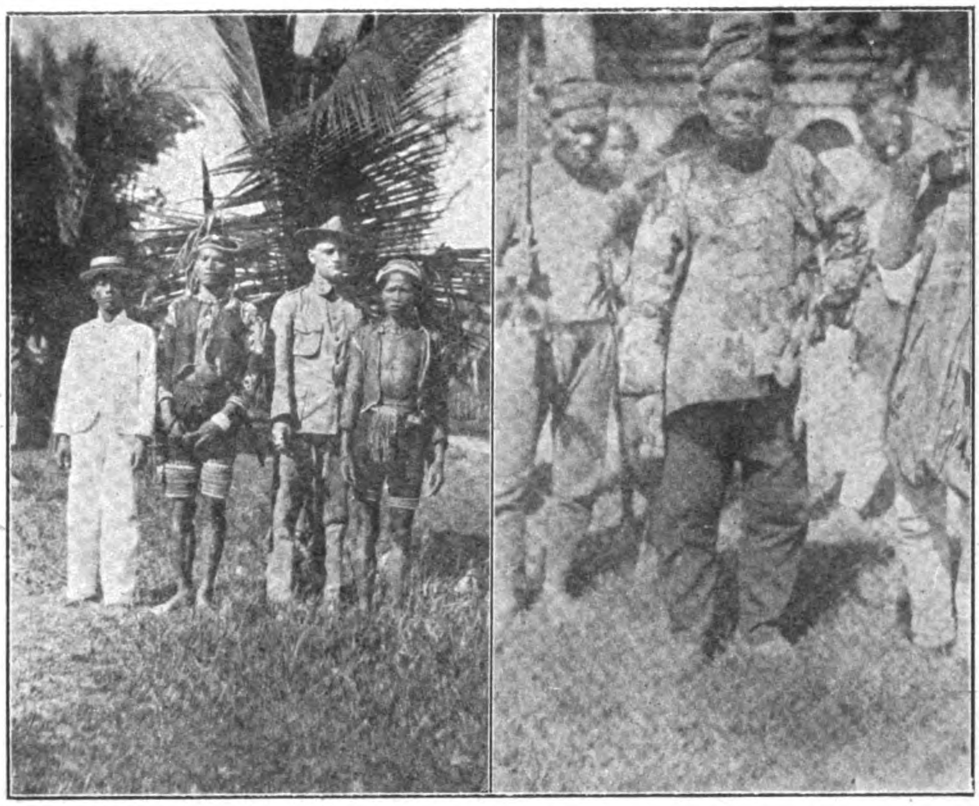
Lakes Liguasan and Buluan, both of which are drained by the river between Sarangani Bay and Cotabato, are well stocked with fish, as are indeed all the waters of the valley and Illana Bay.

Entering the river from the sea one travels about due E. for about 40 ms., and then turns to the N. The general contour of the valley and the mountains on either side also conform to this description. One of the economic forces in the future development of Mindanao and its natural resources, will be the utilization of its immense and numerous waterfalls. The rivers, including the Maledagao, Malita, and others, converging to the river from the mount-



CAPTAIN VAN HORN, U. S. ARMY, AND HIS DATUS AT A JUNTA IN COTABATO UPON THE DEPARTURE OF THE FORMER DISTRICT GOVERNOR, WHO HAD BEEN THEIR "GOOD SULTAN"

DATUS KALI PANDAPATAN AND MASTURA, OF COTABATO DISTRICT, MAKING PEACE AT THE GOVERNOR'S OFFICE AFTER A SANGUINARY FIGHT IN THE HILLS



DATUS OF THE COTABATO DISTRICT WHOSE ENSLAVEMENT OF THE TRIBES RENDERED DEVELOPMENT OF THE COUNTRY IMPOSSIBLE UNTIL AMERICAN SOVEREIGNTY WAS ESTABLISHED

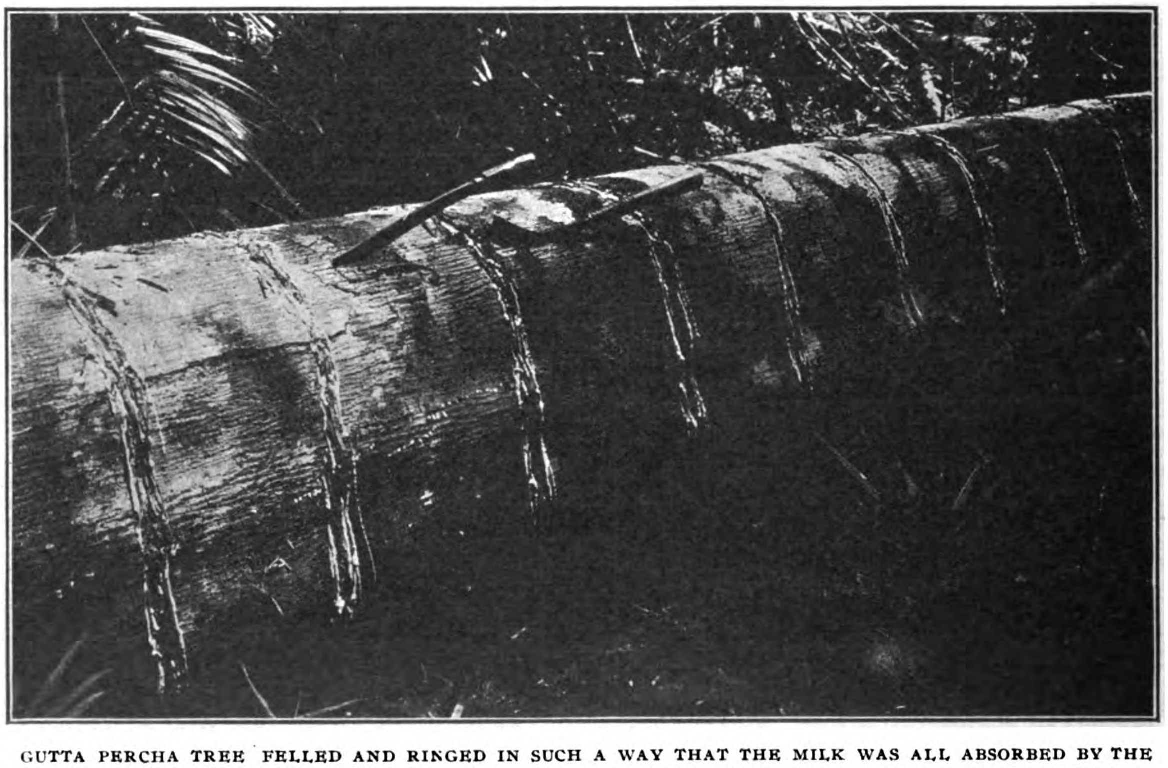
ains, the numerous canals and esteros, cross-cutting the valley, will make irrigation and transportation easy and economical. These waterways are at present used only by the Moros, but with American settlement and industry they will become highways of commerce, to carry to the natural market—Cotabato—the varied natural products of the mountain and the well-cultivated plains. Mr. F. J. Dunleavy, former secretary of the district, who has lived in the valley for 5 yrs. and has explored it pretty thoroughly, writes thus of its agricultural possibilities:—

"I have seen sugar cane growing 29′ in length, by actual measurement; rice that returns 100 sacks for every one planted the first crop, and 10 for one on the second crop; cocoanuts that yield from 2,000 to 3,000 nuts to the tree every year; hemp than which there is no finer in the Islands, as the Manila price for this article will show, some selling last year for ₱24 per picul; tobacco that yields a rich return, and a good strong leaf; peanuts, reaching four crops a year of one kind and three crops of another, yielding 50 to 60 sacks for every one planted; cacao that will produce a crop at 5 yrs. old, and yield two quarts to the tree the 5th yr., and increase after this each year; cotton, an ideal crop as experiments have shown; corn, three crops a year with heavy yield. Para rubber, ceara, or other kinds, should yield rich returns to the cultivator. At present we have only the rubber vine. Bananas, pineapples, eggplants, and other sub-tropical fruits; beans, squashes and peppers grow with little or no attention—in fact, the point is not to make things grow but to prevent other vegetation growing up for the first 2 yrs. and killing off what you plant, by suffocating it. After that the shade keeps weeds down. Planting here is a continual struggle to prevent the useless thing from overgrowing your marketable products, but when the latter is cared for 2 yrs. the rest is easy.

"Some people here, after taking a glance at the valley and its products, have compared it with the Nile region, but there is no comparison either in size or fertility. In the Valley of the Nile the cultivator has ever been near starvation's door in waiting for the river's overflow and many times has been worse off when it does so. Not till the building of the costly Nile barrage was there a way of regulating irrigation in that region, while here in Cotabato one may irrigate economically with the crudest arrangements. The Nile never grew sugar cane 29′ long, nor even in the days of the Pharaohs would it yield three or four abundant crops a year. Irrigation in Cotabato is only necessary for the second and third crops, as the rainfall averages 50″ per year.

"The climate is excellent. The average of the barometer for the past 2 yrs. has been 78 degs. F. Every person is in good health and there is no sickness outside of epidemics, which occasionally visit the Orient.

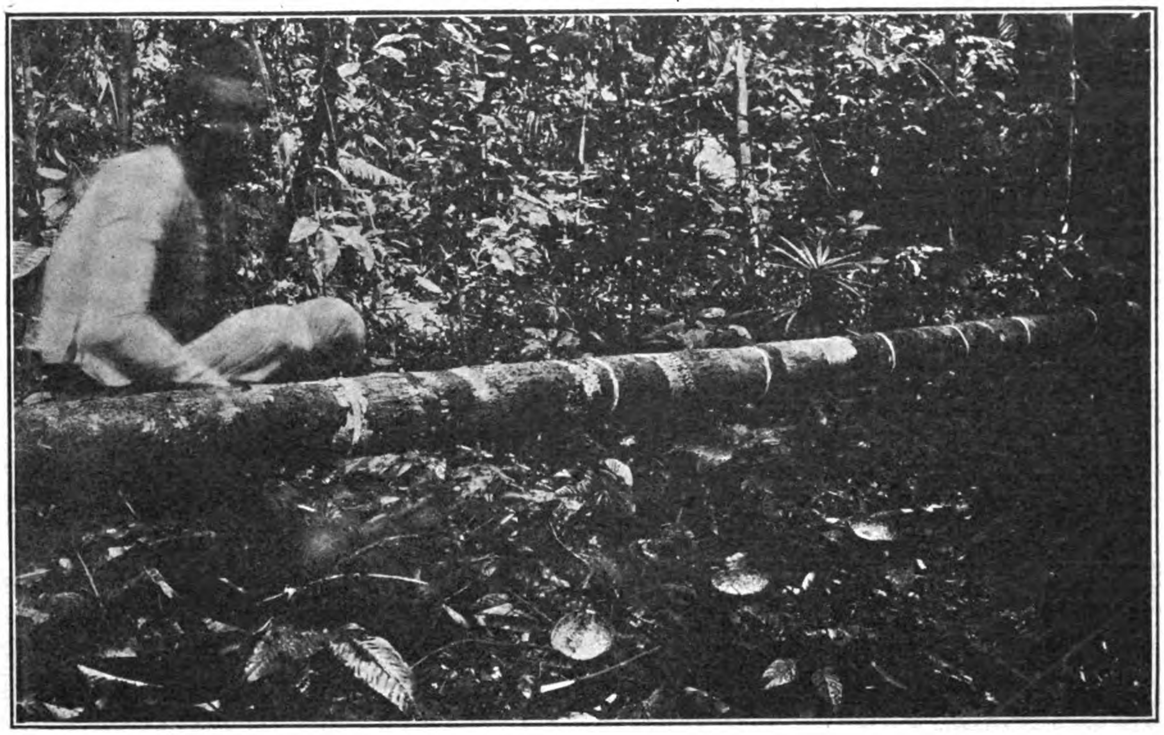
"It may be asked, in the face of all this, why the people of Cotabato are not better off and how it is that this Tom Fiddler's ground was not discovered long ago. This brings us to the people and their customs in the past and present, and to go into these details would make a long story that does not properly belong here. It is enough to say that with the coming of the American, slave-trading and petty warfare between the datus has been abolished. All who desire to work and accumulate property, datu or no datu, will be protected by the American Government. The era of prosperity for the Cotabato Valley has arrived, and all who would get in on the ground floor must hustle."



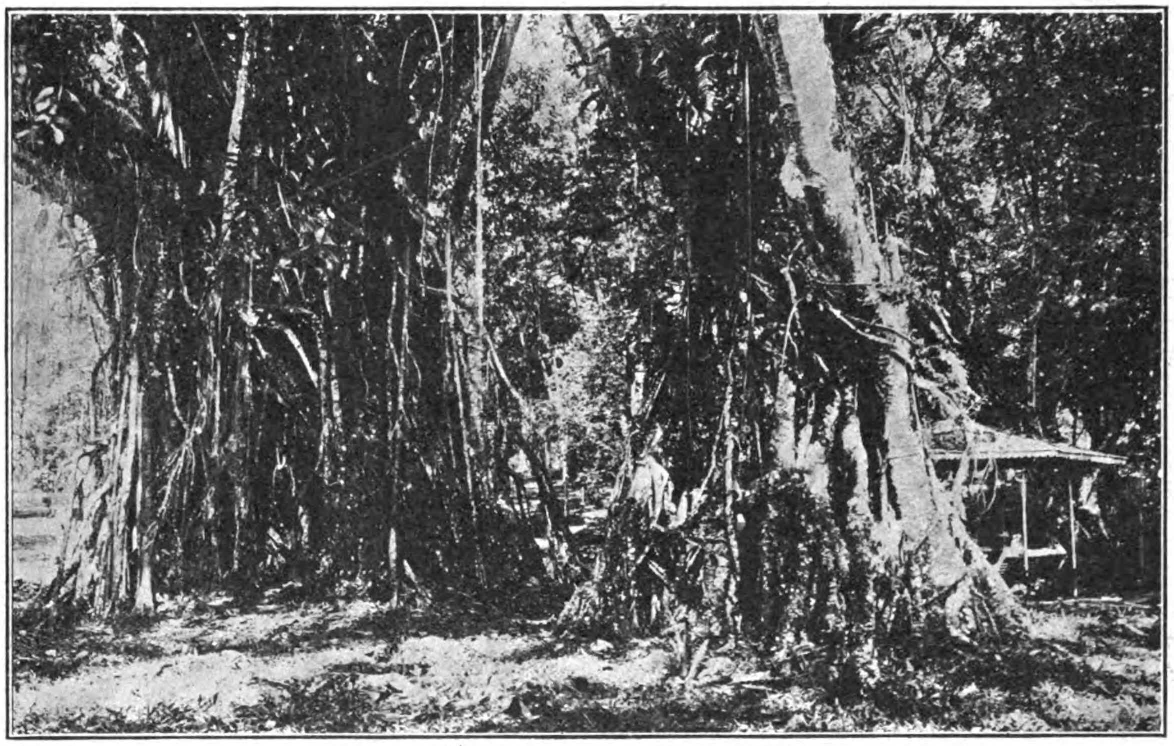
GUTTA PERCHA TREE FELLED AND RINGED IN SUCH A WAY THAT THE MILK WAS ALL ABSORBED BY THE CHOPPED-UP BARK AND NONE ESCAPED TO THE GROUND; THE TWO BOLOS WERE USED FOR MAKING THE RINGS

COTABATO BUSINESS COMMUNITY.—The business community of the Town of Cotabato possesses the same progressive spirit that seems to characterize every portion of the Moro Province. Sui Funsero, the leader of the Chinese traders, has lived in the valley for 38 yrs., and has as much faith in its future now as he had in 1868, when, as a young man, he attempted to start a plantation there. His has been a strenuous life. Leaving his home in Amoy as a young man he became clerk in a Chinese store in the foothills of the Cotabato Valley. Having accumulated a little money he bought carabaos and became a tiller of the soil. Those were days of datu rule. The datus stole the young plantation owner's cattle, drove off his laborers, and on more than one occasion threatened his life. For 4 yrs. he stuck to it, but was eventually convinced that without cattle or labor he could do nothing. In 1879 he opened a general merchandise store in Cotabato, where he has since amassed a considerable fortune in trade. He early won the confidence of the Spanish military authorities, and was for many years a sub-governor in the district. He was decorated by General Blanco, in 1896, for distinguished service in assisting the Spanish Army, and during the troublous times in Cotabato he shouldered a musket and served in the guard. Señor Funsero is a law-abiding, progressive and valuable citizen. About 3 yrs. ago he set out 5,000 cocoanut trees within a few miles of Cotabato, fencing in each tree and employing two men to care for the place. During his absence in China the natives abandoned the place and the Moros destroyed all the trees. "Although I am now an old man," remarked Señor Funsero, in speaking of this incident, "I will start a new plantation now that I am assured of proper protection."

Tomás Roales, a Spanish merchant who has spent many years on Cotabato, thinks colonization is the only method of reclaiming the rich bottom lands of the valley. "Put in 100 American families," said he, "and arm the head of each family with a good rifle and plenty of ammunition. Give him the right to use his gun on any datu or any other Moro who trespasses on his property and attempts to interfere with his business. You may then withdraw the troops if you like. But by all means let the settlers be men of family. This country is no place for young, irresponsible, unmarried men. The married man will be contented, and he will defend his household. It was such men who settled the Great West of your own country." In 1896



GUTTA PERCHA TREE FELLED AND RINGED BY MOROS, THE MILK RUNNING INTO COCOANUT SHELLS ON THE GROUND



"STAND" OF LARGE INDIA RUBBER TREES

Señor Roales undertook an immigration scheme which might have been successful but for the events which followed. He was arranging to bring out from Spain about 400 families, but the Spanish-American War put a stop to it. Señor Roales is a prosperous merchant of Cotabato and owns a fine plantation on an island in Illana Bay, in which he takes great pride.

Señor Yap Dico is another prosperous Chinese merchant of Cotabato who has spent nearly a score of years in Mindanao. He first came to Manila in 1880, and has since been interested in trade between Cotabato, Manila, Amoy and Hongkong. In 1893-4 Señor Dico became interested in a hacienda and store at Mati, on the E. coast of Mindanao, but the location was not satisfactory. When he first went to Cotabato, in 1888, it was with the idea of opening a plantation, but the labor conditions were so averse and the country so unsettled, that he opened a store instead. He has been one of the heaviest exporters of gutta percha and rubber. He is a progressive and a good citizen.

Señor Chui Kai has been engaged in the Cotabato Valley trade for nearly 25 yrs., and has been successful. In former times he was a considerable exporter of rough timber, but has been unable to do anything at it for the past few years on account of the unsettled condition of labor. At the present time he is very anxious to enter upon the cultivation of rice. He is agent at Cotabato for the steamer *Don Engracio*.

Another successful merchant and probably the largest property owner in Cotabato is Señor Antonio Sousa. He first went to the valley in 1883 as a sergeant of Spanish artillery, and liked the country so well that he left the army and settled there. At first he exported carabaos—then an industry of that section—and afterwards opened a trading store. In those days there were from four to six companies of Filipino infantry who lived in the country and made times good. Señor Sousa tried planting, but after he had lost ₱20,000 through the depredations of the datus, gave it up. He owns considerable property and is constantly putting up new buildings. His latest enterprise is a sawmill with a 30" saw, with which he proposes to saw timber for his own buildings.

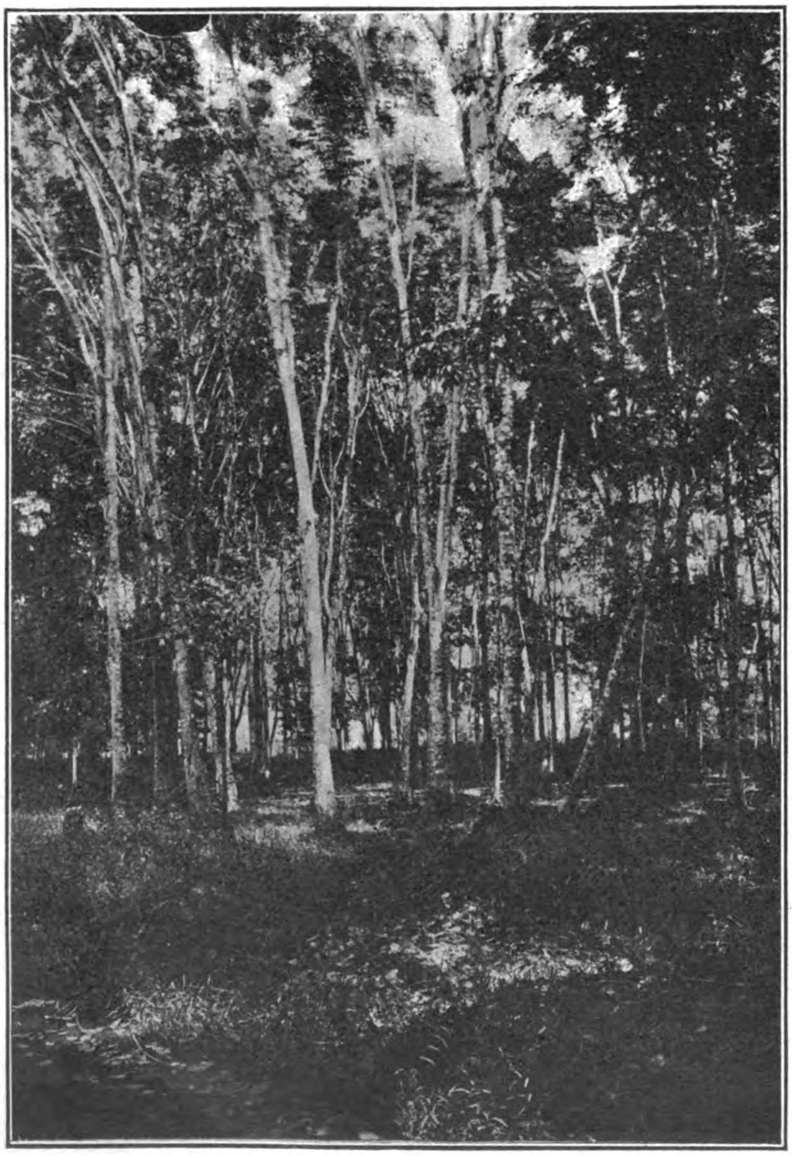
The only American at present in business in Cotabato is E. Womack, who is engaged in taking out timbers for the government sawmill at Parang Parang, where a permanent military post is being established. He reports that there is a plentiful supply of molave, narra, ipil and tindalo in the valley and along the coast, and that he has a good supply of labor. Incidentally Mr. Womack is getting out firewood of good quality.

Among the progressive Chinese merchants of Cotabato may be mentioned the following:—Chio Sua, Celestino Alonzo, Ty Kongco, Cua Cosuy, Tan Quipo, Ong Loe, Tan Cacao, Rafael M. Guerra, Tan Opon, Te Liongco, Lim Pey, Ong Baco, Chy Yuqui, Dy Toco and Tan Setion.

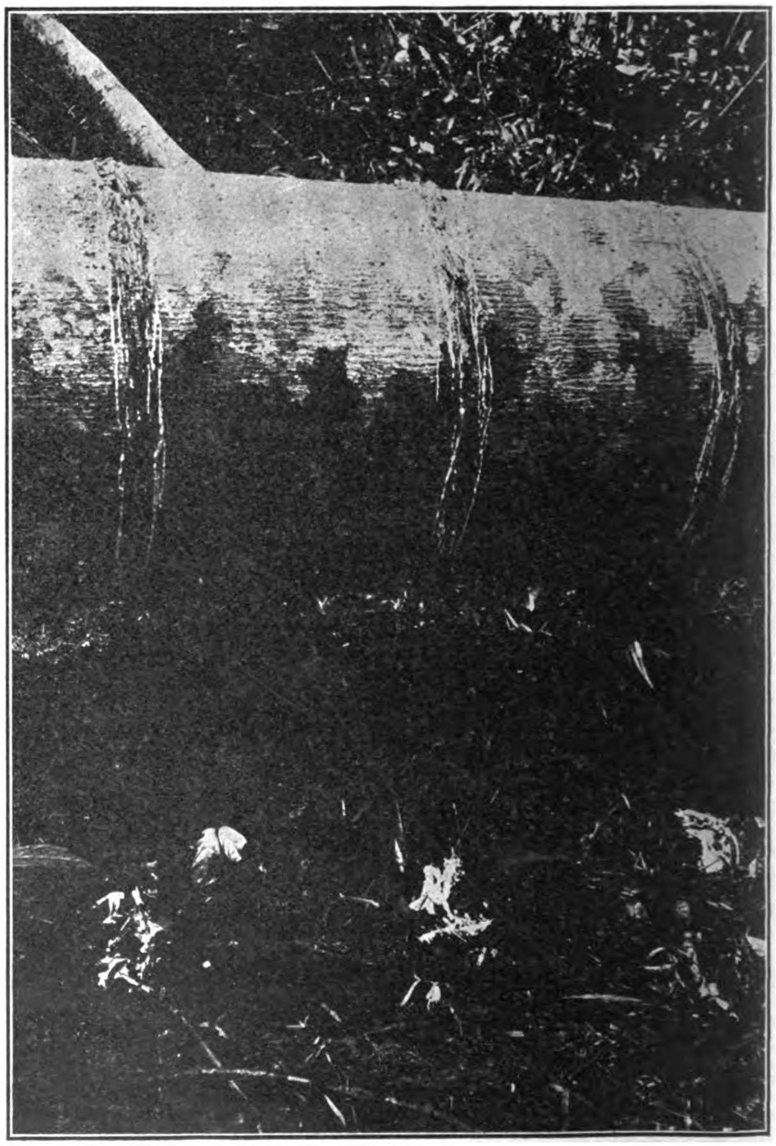
MUNICIPALITY OF COTABATO.—The Municipality of Cotabato is organized with Señor Ignacio Ortorste as presidente. He is a progressive Filipino. The members of the council are all Filipinos, holding the offices by appointment. José de las Heras is the justice of the peace of the town.

Cotabato is very prettily situated and is kept in excellent order. A public improvement that the town may well be proud of is the new market recently erected on an island opposite the town, to which the municipality maintains a free ferry. The market is substantially built along modern lines, with concrete floor and corrugated-iron roof. A portion of it is divided off into stalls, which may be locked up. These were all rented in advance before the construction of the market was completed. The Moros and Tirurays (wild people) come in from miles around, bringing their farm produce, native cloth and curios.

Two companies of American troops and one company of Moro Constabulary are stationed at Cotabato



"STAND" OF PARA RUBBER PRODUCING SEEDS; EXPERIMENTS PROVE THAT THIS GRADE OF RUBBER WILL THRIVE THROUGHOUT THE MORO PROVINCE, AND ESPECIALLY IN THE COTABATO DISTRICT, WHERE THE INDUSTRY IS BEING REVIVED UNDER AMERICAN PROTECTION



GUTTA PERCHA TREE FELLED AND RINGED IN SUCH A MANNER THAT A GREAT PART OF THE MILK WAS NOT ABSORBED BY THE CHOPPED-UP BARK; IT RAN DOWN TO THE GROUND AND WAS LOST

BRIGHT FUTURE FOR RUBBER CULTURE IN THE MORO PROVINCE

[With reference to the great possibilities of the gutta and rubber industry in the Moro Province, THE FAR EASTERN REVIEW *regrets that it is unable to publish in this edition an article by Mr. F. J. Dunleavy, of Cotabato, on the subject. It reached our table at too late a date to receive the consideration it deserves. With facts and figures Mr. Dunleavy shows that by proper encouragement and management almost any part of the District of Cotabato could be transformed into most attractive and large dividend-paying gutta and rubber plantations. He also shows that sugar cane, hemp, cocoanuts, almaciga, beeswax, cinnamon, nutmegs, coffee, cacao, palay, rattan, lumber, pearl shells and sponges are the natural products of the district, and are a splendid investment. Coal is found in the district in the vicinity of Lebak and between there and Sarangani Bay. Platinum is found up the Cotabato River, in the Monoho country. Copper is found in the mountains between Krau and the Tugus River in the Monoho country. Mr. Dunleavy found good prospects in the country named, but whether it will pay can only be determined by time and trial.*—EDITOR'S NOTE.]

Rubber was first introduced into the Philippines, or perhaps it would be more accurate to say, into the Island of Mindanao, as it is in this section of the archipelago that the greatest amount of planting has been done, through official channels, writes Mr. W. I. Hutchinson, forester of the Philippine Bureau of Forestry, who is doing field work in the Moro Province, to the Moro Province edition of THE FAR EASTERN REVIEW. Up to the present time Para rubber seed has been secured either from Sandakan, Borneo, or Singapore, through the Bureau of Forestry at Manila and the Government of the Moro Province. A few private ranch owners have also obtained small shipments of Ceara and Castilloa seed from Ceylon.

On account of the different methods of treatment, growth, etc., of these various species, they will be considered separately.

PARA RUBBER (*Hevea braziliensis*).—During 1905 several small lots of Para seed were received in the Philippines. Early in the year the Moro Government obtained 1,000 seed from Sandakan, Borneo, which were distributed among ranch owners and government officials throughout Mindanao, but of these seed few germinated, due without doubt to their infertility, and the lack of knowledge as to the proper methods of planting.

In October, 1905, the Bureau of Forestry at Manila received 5,000 seed from Singapore, 2,500 of which were sent to the Island of Mindanao, where they were planted in seed-beds at the Moro Government Experimental Farm, located on the Zamboanga Peninsula. Although every care possible was given the seed, which were planted within a month from the date of shipment, only about 400 of the total number sprouted. The average rate of growth of these nursery plants was about 18″ in 50 days, seeds unfiled when planted.

In January of the present year the Moro Government again made a purchase of 6,000 seedlings, which had been raised from seed at the Lamao Forest Reserve, Bataan Province, by the Bureau of Agriculture. One thousand of these seedlings were distributed to farmers in the vicinity of Zamboanga, and the remainder placed in seed beds to await a favorable season for planting.

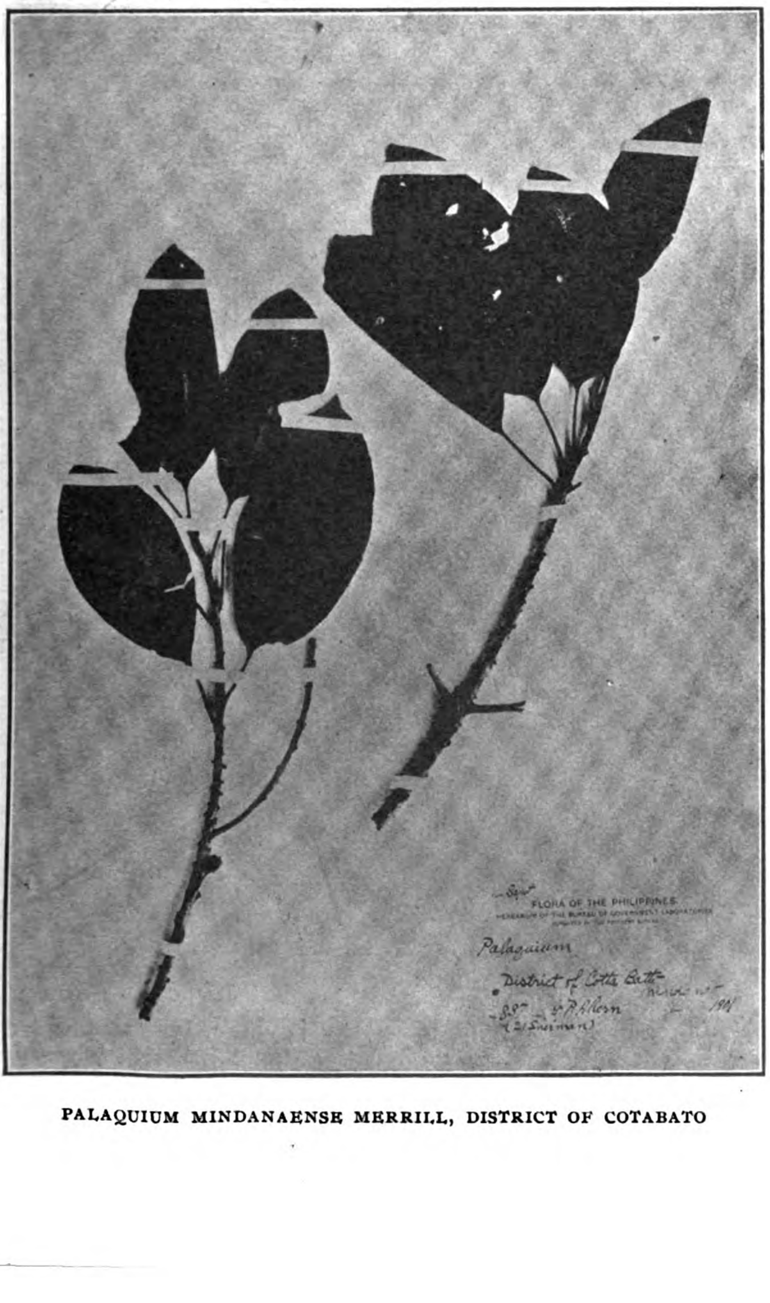
It is the intention of the provincial government to distribute a number of these seedlings among the principal towns of the province, in order to ascertain which section of the country is best suited to rubber growing. A plantation will also be established on the government farm at an elevation of 25′ above sea level, with sample plots in the surrounding mountains at different altitudes up to 1,200′.

CEARA RUBBER (*Manihot glaziovii*).—As far as is known to the writer, there are only two rubber plantations of any size in the Philippine Islands, and these are located on the Island of Basilan, Moro Province. These plantations are situated at 200 and 500′ elevation, and contain 2,500 and 1,000 trees respectively. The soil of both of these areas is a well drained, rich, heavy loam, with a small amount of volcanic gravel intermixed.

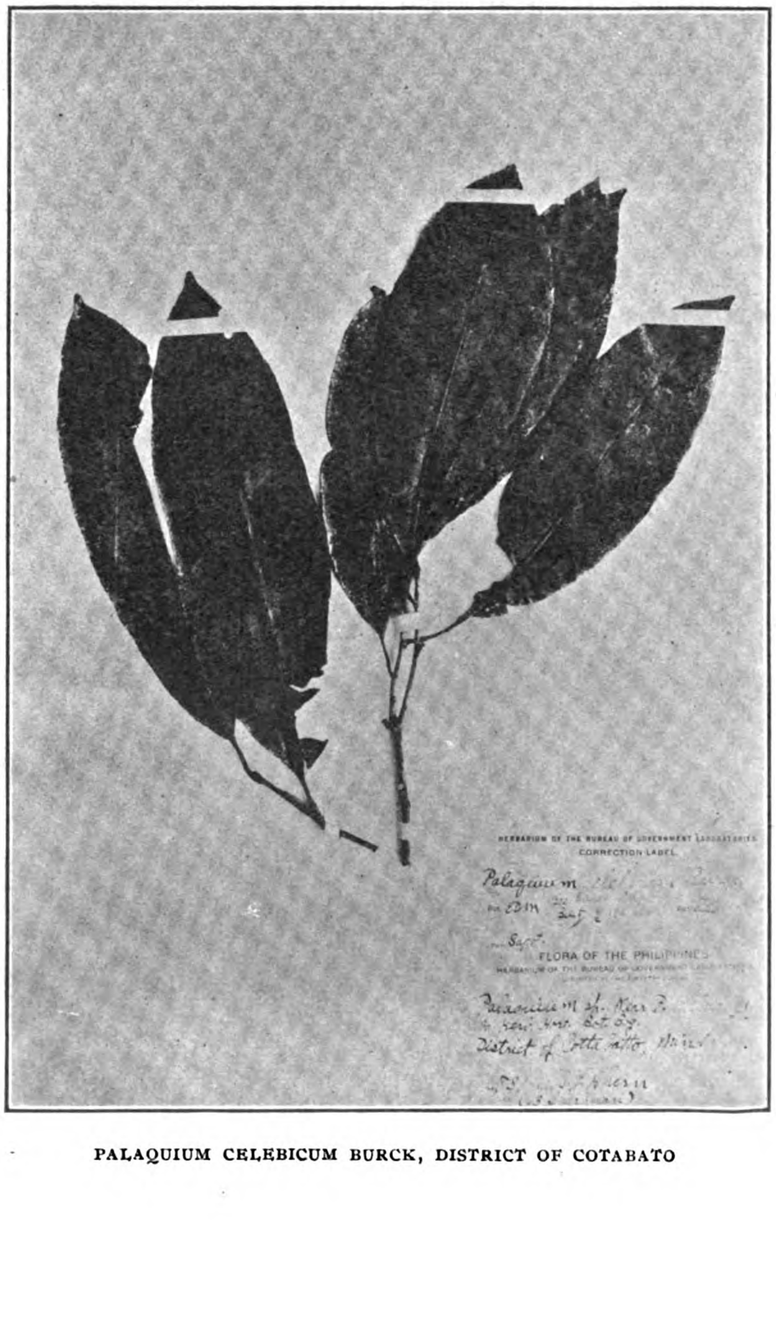
The following figures on the annual rainfall of the island were furnished by the Weather Bureau sub-station at Port Isabela, Basilan:

Year.	Total rainfall.
1903	65.30″
1904	74.25″
1905	42.43″

The Ceara seed after having been *en route* for 8 mos., were filed and planted directly to stake. At the lower elevation 2,500 out of 3,000 seed germinated, while at 500′ something over 1,000 plants were obtained from 1,500 seed.



PALAQUIUM MINDANAENSE MERRILL, DISTRICT OF COTABATO



PALAQUIUM CELEBICUM BURCK, DISTRICT OF COTABATO

The following measurements of growth made by Mr. Hutchinson, will be of interest to all rubber growers, and as far as is known compare favorably with the growth of other trees of the same species and age, planted in the East:—

Ceara Rubber.—Elevation 500′; planted 15 ×15′; Age 7 mos. 5 days; No. trees measured 43; average height 12′ 9″; maximum height 17′. Elevation 200 feet; planted 15×15′, age 5 mos. 15 days; No. trees measured 65; average height 9′ 9″; maximum height 13′.

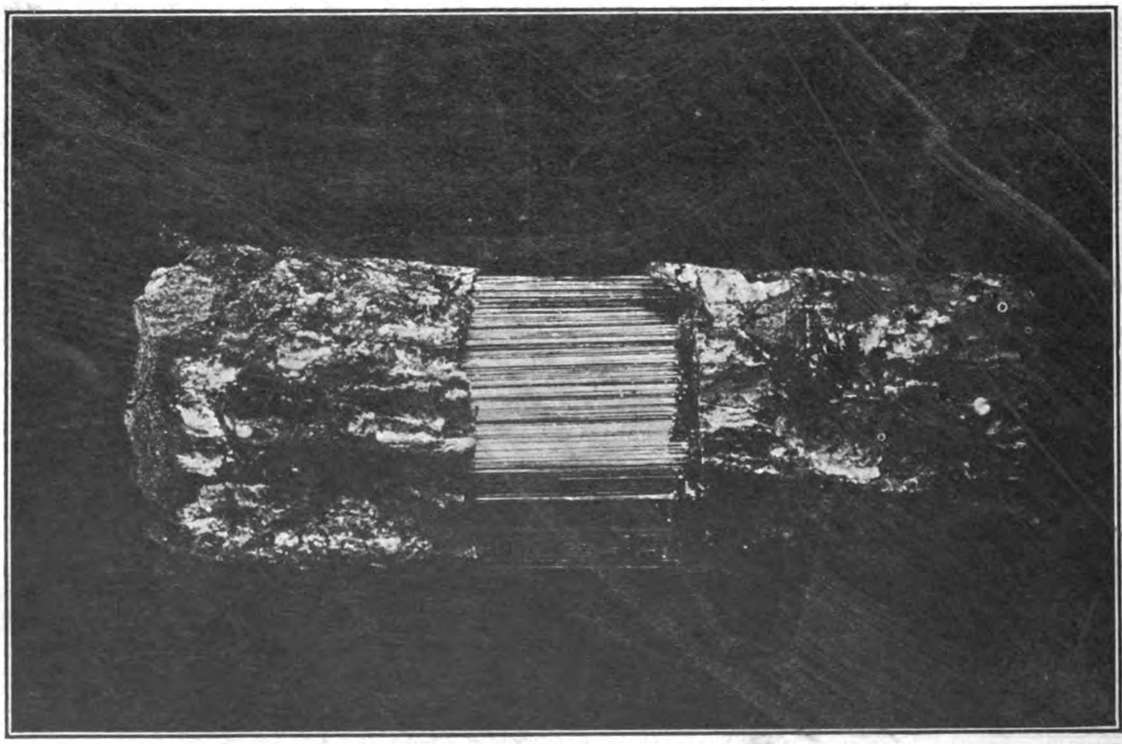
CASTILLOA RUBBER (*Castilloa elastica*).—A small Castilloa plantation, containing some 400 seedling trees irregularly spaced, has recently been set out on the Island of Basilan at an elevation of about 50′ above sea level. The soil on this situation is a rich, heavy loam which has been washed down from the surrounding mountains, and contains but a small amount of gravel.

The measurement of 45 plants in the seed-bed, which are slightly larger than those set out in the plantation, gave the following results:—

Castilloa Rubber.— Age 4 mos. 25 days; No. seedlings measured 45; average height 17″; maximum height 29″.

RUBBER VINE GROWING IN THE FOREST

After watching the growth of Para and Castilloa seedlings in nursery beds, and Ceara trees in plantations, it is the forester's opinion that all of these species are well suited to the climatic and soil conditions as found in the Island of Mindanao. Para, however, may not prove a success on some of the drier situations.



PIECE OF DRY BARK FROM A RUBBER VINE

Rambong (*Ficus elastica*), the other great rubber-producing species under cultivation, has not received a trial to date.

Which of these four species will give the greatest average yearly returns per acre in these Islands, is a question which time alone can solve. Almost every large ranch owner in the E. part of the Island of Mindanao will plant more or less rubber this year. Plans are being made to try all the principal kinds of rubber trees, and it is hoped that the species best adapted to the Philippines may be determined in the near future.

With the ever-increasing demand for rubber the limited area suitable for its production, and the rapid exhaustion of the jungle product, it will doubtless be many years before the supply will even in a small measure be able to meet the demand.

In this new country people have been slow in starting to plant rubber, but the first step in the right direction has been taken, and the day may not be far distant when the Philippine Islands will be reckoned as an important factor among the rubber-producing countries of the world.

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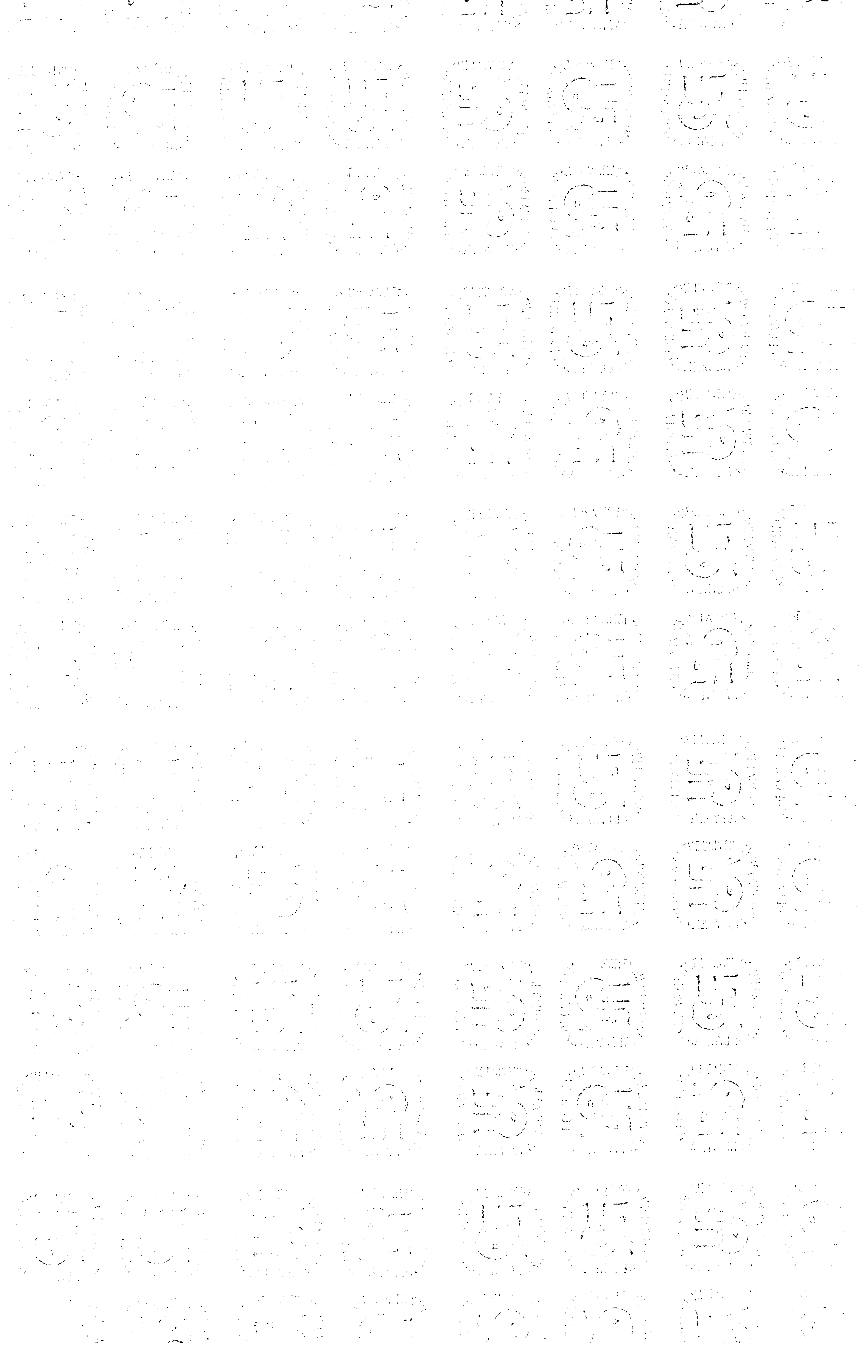

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